438 Service Manual

ISSUE 05/01

071-26938-400(B)

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USING THE MANUAL

1. TABLE OF CONTENTS

Each capitalized alphabetic character represents a major division within the manual (Section A).

Under each major division, the capital letter is followed by a number. This represents a subdivision of the major section (Section A1. is a subdivision of A.).

Under each subdivision, an alpha-numeric combination is followed by a decimal and a lower case letter. This represents a smaller division under a subdivision (Section A.1a. is a subdivision of A.1, Section A.1a1 is a subsection of A.1a).

Each major section of the manual begins with page 1 and is numbered in sequence through that section only. Section A begins with page 1, section B begins with page 1, etc. There are not necessarily any subdivisions beyond level 1 in a Parts Catalog.

This manual is divided into Section A through J. A detailed table of contents is located on the first page of each section.

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2. HEADERS / FOOTERS

The information listed along the left edge refers to the machine, the manual type, and the part number and revision level for that manual

The particular issue listed in the center is an internal tracking device.

The top line of information along the right side states the title of the particular section. The bottom line lists the section and the page number within that section.

3. LIST OF CHANGES IN THIS REVISION

438 Service Manual   071-26938-400
Rev. B Issue 05/01
ECN: 7483
Previous release: Rev A
Changes incorporated in this manual:

Section	Change
A.3a	Changed auxiliary feed belts to "blue" from "red"
	Singulator - removed color description as this roller may be orange or blue
	Feed Sensor and Double Detect Sensor - added "The amplifier is located on the machine side frame in the singulator area."
	Optical Mark Reader removed from "Optical Mark Reader or Read Sensor"
A.3b	Add "Sensor Module" section
A.3c	Folder Drive Motor -added "and the upper and lower dump shafts on the accumulator"
A.3e	Changed this section description to "Exit Conveyors" and added supporting material.
A.4	Loading Capacity changed to "1500"
	Group Selector changed to "1 to 7 sheets"
	Updated electrical service specs
A.7j	AC/DC added "non-775"
	Changed screen shot for Inserter Setup 2 & 3
	Added explanation for Open Feed
	Added "Ink Marking is normally located at Station 7."
	Rewrote Postal Meter Section
A.8a	Added 1/10" spacing
A.8c	Added "Press "Cancel" to void any changes made to this screen or "Ok" to set the changes and return to the "Line Read Setup 0" screen."
	Changed Parity Mark to " Not available at this time."
	Added 1/10" option in Lines/Inch - Line Read Setup 2
	Added 1/10" in two places in Calibration section
	Added "set in "Line Read Setup 3 (Group Seq and Page Seq - Min and Max)"
	In Line Read Setup 4, step 8 added "If these values are not obtained, go to section A.8b and reset the probe."
A.8d	Removed "Miscellaneous Problems" section

A.9d	Rewrote "Bit Number"
	Added explanation of character length in Bar Read Setup 2
	Eliminated all "(1-30)" in the Bar Read Setup 2 section
C.2	Change CPU 186 to CPU 486 (2 places)
C.3b	Added Analysis and Initial Action for 12821 "MISSED PAGE"
C.3f	Added read error probable causes and remedies
D.2b	Change CPU 186 to CPU 486
D.3	"RCP for Feeder Speed Encoder"- Change CPU 186 to CPU 486 (2places)
	"RCP for Feed Sensor"- Change CPU 186 to CPU 486
	"RCP for Two Sheet Sensor"- Change CPU 186 to CPU 486
	"RCP for Read Board Error", "Presets Corrupt"- Change CPU 186 to CPU 486
D.4b	"RCP for Stack Sensor", "Presets Corrupt"- Change CPU 186 to CPU 486
	"RCP for Accumulator Sensor" Change CPU 186 to CPU 486
	"RCP for Accumulator Dump Clutch" Change CPU 186 to CPU 486
D.4c	Added section for Accumulator Dump Roller Replacement
D.6c	Change CPU 186 to CPU 486
E	Added PWB information
H.3	Added #30 Bar Read Commport setting
I	added 191-26400-400, Top Mount Bar Code Reader
	Added 088-27684-500, Single Channel/Double Probe Reader
	Added 041-26521-500, Disconnect Switch Assembly
	Added 186-035700600, 3208 Bulk Loader
	Added 750-26978-500, 3208/Feeder Mechanical Interface
	Added 750-27737-500, 3208/Feeder Electrical Interface
	Added 044-27423-400, European Power Conversion
	Added 389-27146-400, Buhrs Interface
I-5	changed item 26 part number
I-11	changed item 10 part number
I-17	added parts 14,15 and 16
I-21	changed item 5 part number
I-31	added note to see section J
I-35	added note to see section K
I-45	added item 52
I-47	added item 41, changed item 15
I-49	added item 55
J	added MB Accumulator section
K	added MB Folder section
	Added replacement # for 186-2823500088 as 118-30307-600, 8-19-2009

4. SECTION ISSUE DATES

Sect A   05/01

Sect B   05/01

Sect C   05/01

Sect D   05/01

Sect E   05/01

Sect F   05/01

Sect G   05/01

Sect H   05/01

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Sect K   05/01

SECTION A - INTRODUCTION

A.1   REQUIRED MANUALS

The following manuals are available for the 438:
- 071-26552-400 MB MULTIMASTER 38 OPERATOR
-

A.2   INTRODUCTION TO THE MANUAL

This manual is intended for service technicians and is organized to enhance preventive maintenance, troubleshooting, and repair of the 438. Installation of the 438 is also described.

A.3   INTRODUCTION TO THE MACHINE

A.3a   FEEDER SECTION

The 438's feeder is bottom fed, top loading for continuous operation, with a capacity of 1500 sheets (20 lbs).

Creeper Conveyor

The Creeper conveyor comprises two black rubber belts driven by a motor located on the bottom side of the hopper. Controlled by a paper level detector, the motor is activated when the detector indicates that paper is low.

Hopper and Feeder Paper Guide Rails:

The two stainless steel rails mounted on the hopper are adjustable via a locking handle at the rear. At the front they interlock with the feeder side rails, then lock to shafts running across the machine. Both sets of rails should be adjusted together.

Paper Hopper

The Paper Hopper supplies the bottom fed friction feeder continuously while the operator loads paper from the top. It has 4 mounts (2 each side, with set screws) in which the hopper slides. The Hopper Table is located behind the feeder. Paper level in the hopper is controlled by a demand switch. The position of the hopper table determines how well the demand switch will perform this function. During normal operation a metal wand rests on the incoming paper. As more paper is needed, the metal wand will fall low enough to close the demand switch. This activates the creeper conveyor motor to drive the hopper belts, conveying paper into the feeder area under the paper level detector. When the proper level of paper is attained the wand will have been lifted enough to open the switch, shutting off the creeper conveyor motor.

DISPLAY

FOLDER

CREEPER CONVEYOR

ACCUMULATOR

EXIT CONVEYOR

FEEDER

FOLDER CABINET

CABINET WITH
ELECTRONICS
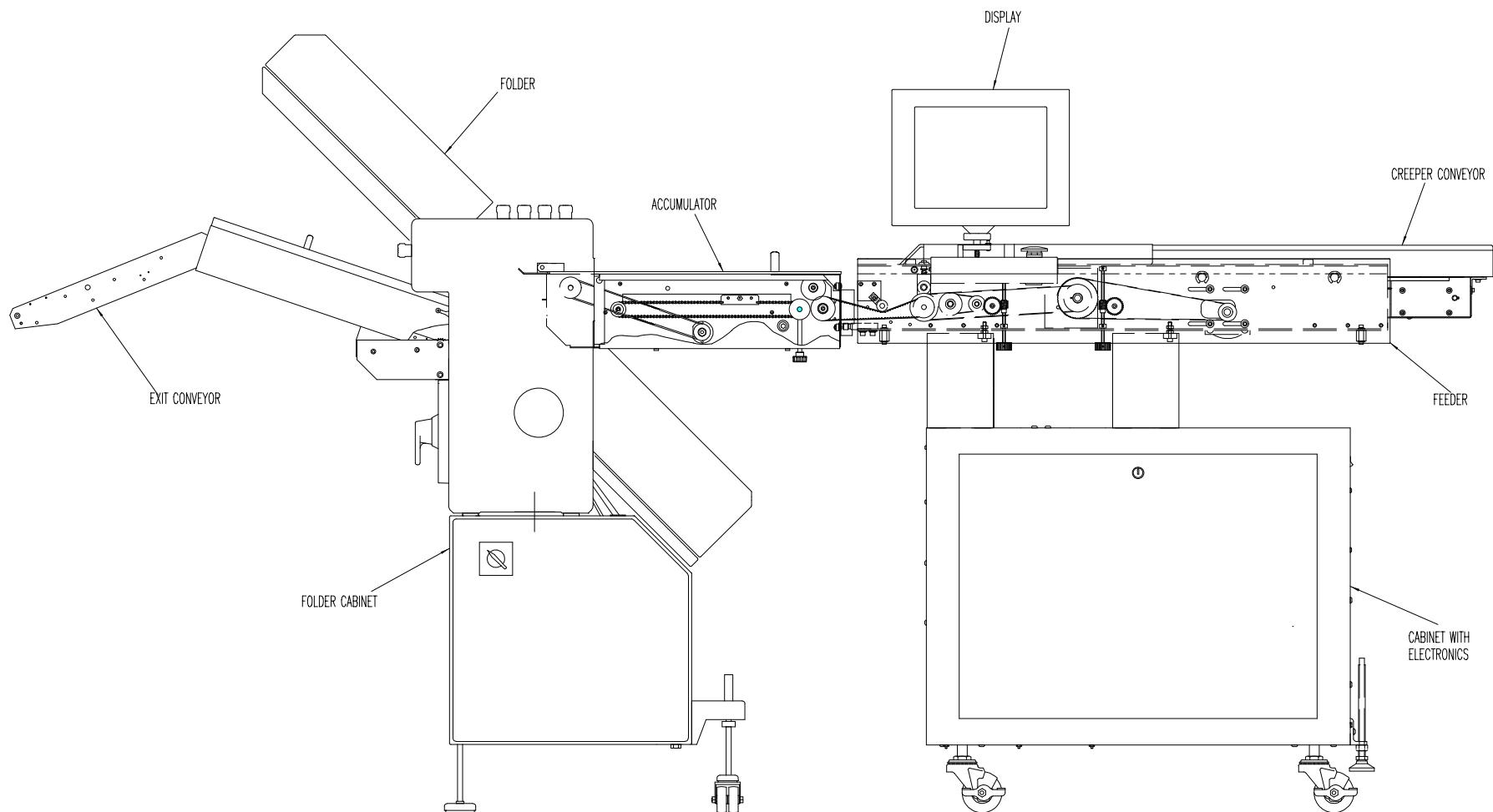
Layout of Model 438 Figure

Feed Belt

The Main Feed Belt is a one inch wide yellow timing belt which drives the
bottom sheet of paper under the singulator roller. Also called Singulator Belt.

Auxiliary Feed Belts

These are two blue urethane belts located either side of the main feed belt.
The auxiliary feed belts assist the main feed belt, smoothing variations in
frictional drive (correcting erratic feeding of the paper).

Drive Rollers

These two orange rollers are located directly below the singulator. These are
used in conjunction with the singulator to ensure only one sheet is fed at a
time.
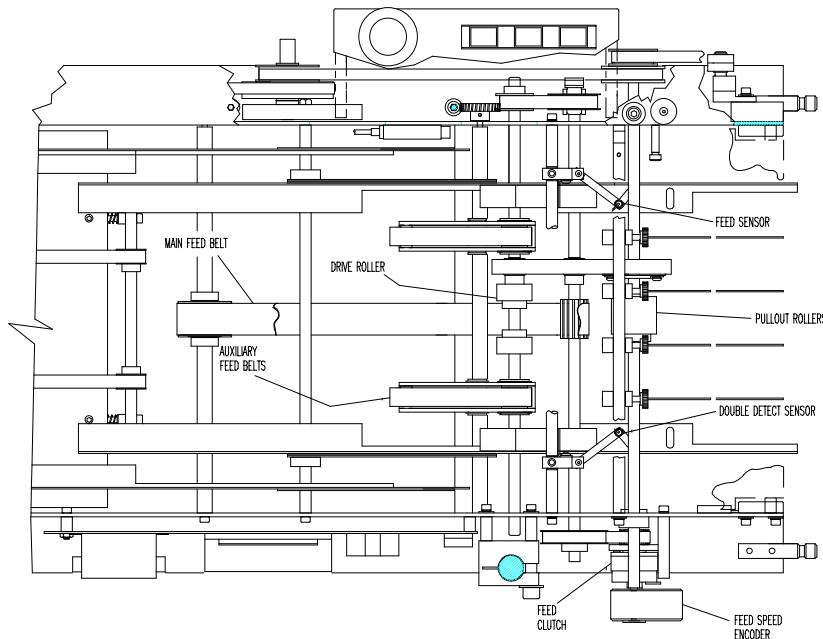
**Feeder Section
Figure**

Paper Level Detector

This demand switch monitors the paper going into the feeder area. It's job is to limit and demand the amount of paper that is most productive to the feeding process. The Paper Level Detector monitors the paper through a metal wand.

Singulator

A two inch stationary roller which rests above the feed belt in the center of the feeder and allows only the bottom sheet of paper to be fed while holding back all others.

Feed Sensor

The Feed Sensor monitors the output of the singulator for proper singulation or non-feed of paper. It is a light-actuated through-beam sensor, identified by an "F" on the amplifier. The sensor module is located on the feeder side frame in the singulator area.

Double Detect Sensor

The Double Detect Sensor monitors the output of the singulator for double feeds. It is a light-actuated through-beam sensor, identified by an "D" on the amplifier. The sensor module is located on the feeder side frame in the singulator area.

Feeder Speed Encoder

A blue-clad optical encoder located on the right side of the upper pullout shaft. It is used to detect feeder run speed.
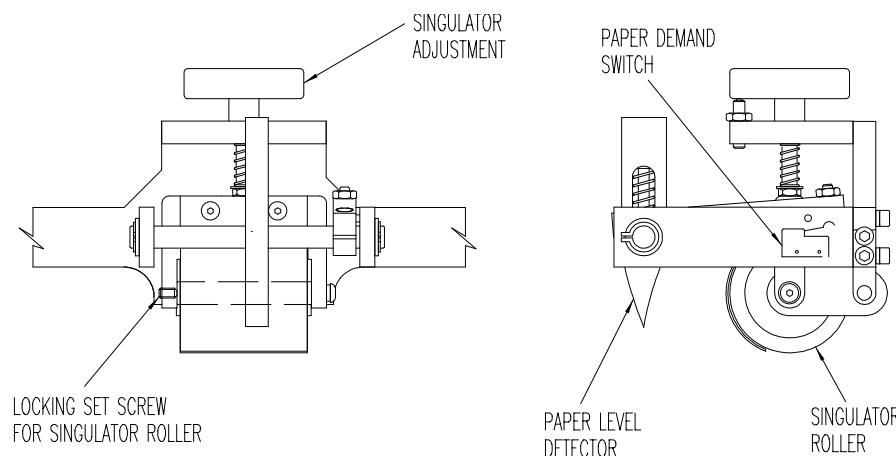
Singulator Figure

Feed Clutch

Electrical clutch which engages the feed belt at a signal from the controller.

Read Sensor

Reflective beam sensor located on either the left or right feeder side rails. A reader logic board interprets variation in light intensity as it is reflected off the paper and code marks.

A.3b   ACCUMULATOR SECTION

The accumulator is fed paper from the singulator, assembling groups of one to seven documents. When the document package is complete, it is fed to the folder.

Stacking Ramps

Stacking Ramps are the plastic wedges which position successive pages of a document package in order.

Stacking Rollers

These are used to stop the paper and hold it in position. When released, the Stacking Rollers drive the collected pages out of the accumulator.

Dump Brake

This prohibits the rollers from releasing paper from the accumulator.

Dump Clutch

This activates the stacking rollers, releasing the accumulated pages.

Accumulator Sensor

The Accumulator Sensor indicates presence or absence of a package in the accumulator. It also monitors package discharge when the dump clutch has been engaged.

Stack Sensor

Located at the edge of the ramps, the stack sensor indicates the document has cleared the stacking ramps.

Sensor Modules

The Sensor Module for the Accumulator and Stack Sensors are accessible by removing the right side accumulator cover.
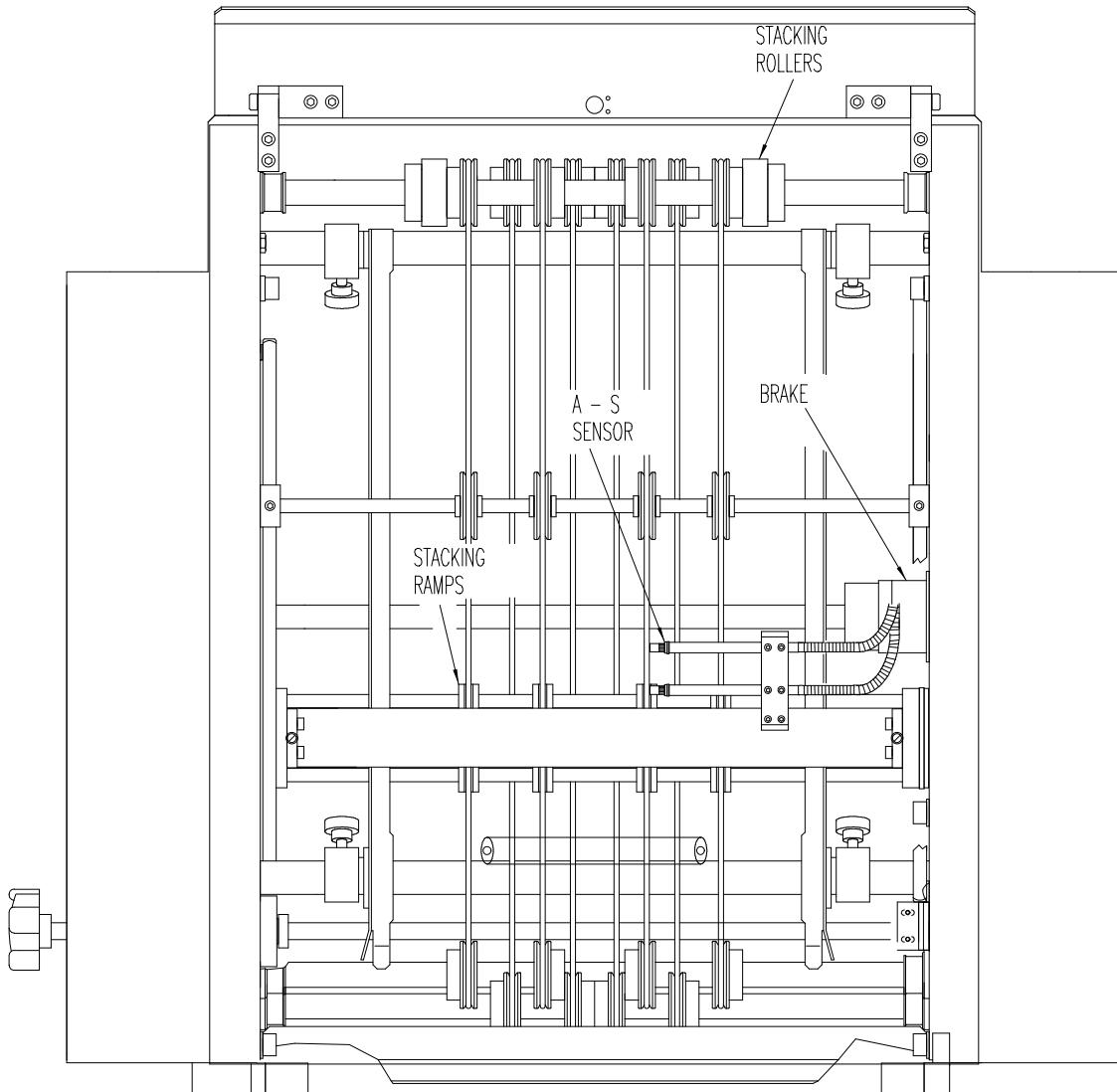
Accumulator Section Figure

A.3c   FOLDER SECTION

The folder is capable of placing 1 to 4 folds in a C, Z, V, or double V configuration. It is fed by the Accumulator Section.

Buckle Plates
Manual adjustable plates which set the distance of the fold from the edge of the paper.

Rollers
Used to nip the paper as it is buckling, creating the fold.

Folder Drive Motor
A motor which drives all folder shafts and rollers and the upper and lower dump shafts on the accumulator.

Folder Speed Encoder
An encoder, located on the infeed roller shaft, which provides a folder speed signal.
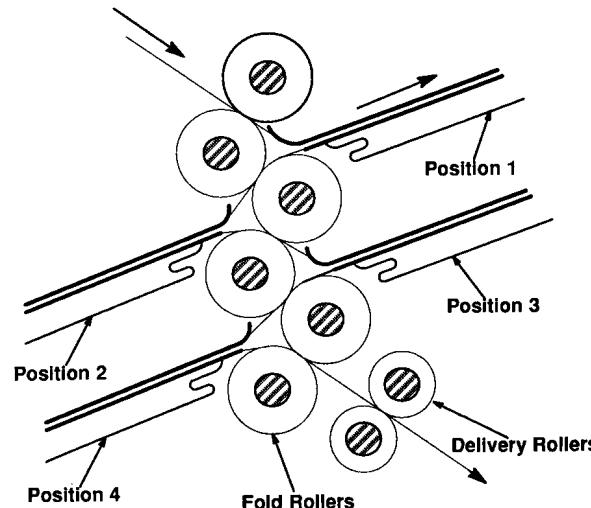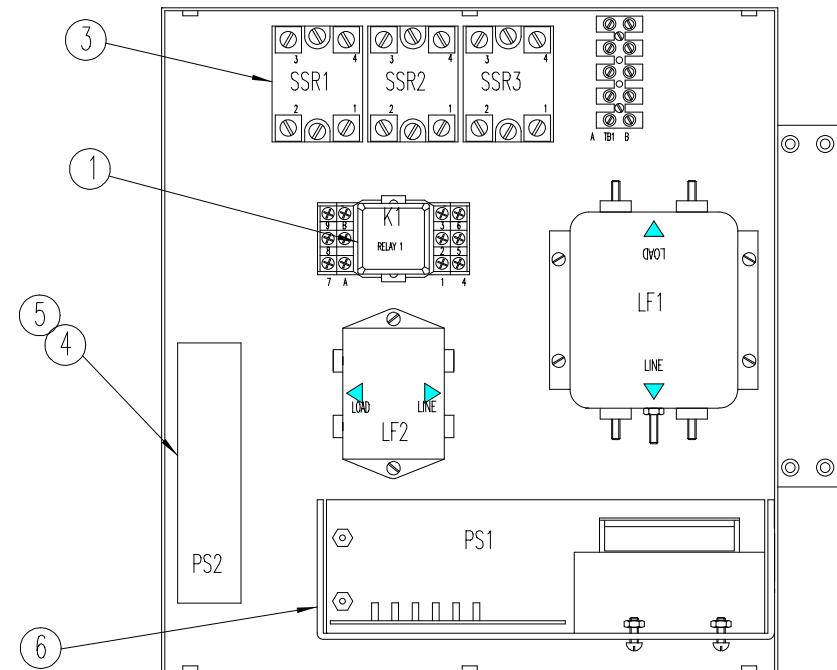
A.3d   POWER UNIT

The Power Unit is located inside the cabinet and consists of the following components:

1. Master Relay: Electric safety interlock switch.
2. Fuses: Fuse tips illuminate when the fuse is bad
3. Solid State Relays (SSR): For switching high power items, motors, etc.
4. 5 VDC Power Supply: logic power.
5. +12VDC and -12VDC power: also logic power
6. +24 VDC Power Supply: power clutches, etc.

Power Unit Interior Figure

A.3e EXIT CONVEYORS

Straight Conveyor (AM52 Delivery)

This is an optional stand alone straight conveyor that enables the 438 to be used in a "stand alone" configuration.

Transfer Conveyor (8.5" and 11" versions)

Transfer Conveyor Package Presence Sensor and Module

This monitors the presence of paper packages in the first station of the transfer conveyor.

Transfer Conveyor Discharge Sensor and Module

This monitors the discharge of paper packages from the output conveyor. It acts to confirm the processing of specific documents.
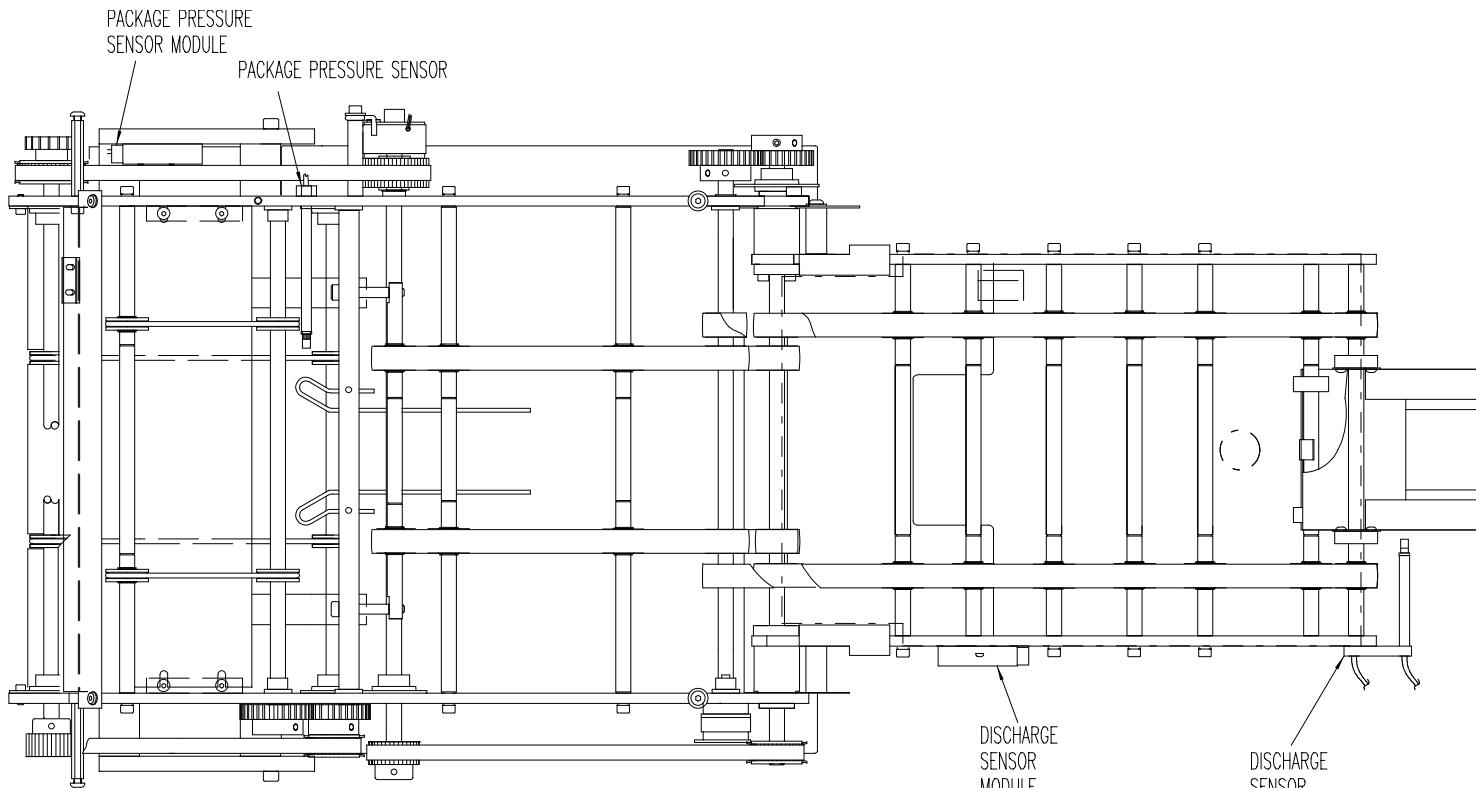
A.3f EMERGENCY STOP INTERLOCKS

The main E-stop located on the operator panel will interrupt power to the conveyors and folder when pressed down. This switch must be twisted to bring it back to it's original upper position.

An extra contact is provided on this E-stop switch which is routed to pins 30 and 33 of the Inserter Connector located on the adaptor plate on the end of the cabinet. This will effect an E-stop to an external device when these contacts are wired to the E-stop circuit on that external device (e.g. Pinnacle). A connection to the 438 interlock string has been provided on pins 28 and 29 of the same Inserter Connector which allows an external device (e.g. Pinnacle) to E-stop the 438. For this E-stop string to be functional a blue jumper across pins 24 and 25 of Module #7 on the I/O Board must be removed. If this E-stop string is not used this jumper must be in place. Pin 11 of this connector also provides an "Interlock Sense" signal to an external device.

There are six (6) safety interlock switches which will interrupt power to the conveyors and folder whenever a cover is opened:

- Under the cover located over the singulator mechanism
- Under the cover located over the accumulator section.
- On the top cover of the folder.
- On the lower cover over the (#2) buckle plate.
- On the folder and transfer conveyor meeting point (interrupts power when the transfer conveyor is removed).
- On the clear lexan cover of the transfer conveyor.

PACKAGE PRESSURE SENSOR MODULE
PACKAGE PRESSURE SENSOR
DISCHARGE SENSOR MODULE
DISCHARGE SENSOR

A.4 MACHINE SPECIFICATIONS

Listed below are specifications for the 438:

Throughput

Speed: Max. 30,000 documents per hour

Material

Paper Weights: 20# (75 GSM) to 24# (90 GSM), Inquire for heavier weights
Paper Size: 7" x 7" (178 mm x 178 mm) to 11" x 14" (305 mm x 356 mm)
Loading Capacity: 1,500 sheets of 20# bond.
Fold Types; "C", "Z", "V" & DOUBLE "V"
Porosity: 20 Gurley seconds
Stiffness: 20 Lb. Stock, 170-225 Gurley Stiffness Units
24 Lb. Stock, 250-300 Gurley Stiffness Units
Cross Grain Stiffness: 20 Lb. Stock, 8~125 Gurley Stiffness Units
24 Lb. Stock, 12~150 Stiffness Units
Moisture Content 4-6% by Weight

Components

Feeder: Bottom feed, top loading for continuous operation.
Optical Reader: Optical code reading for group batch recognition, sequencing and double printing control of 1 to 5 document groups. Larger group batch setting available upon request.
Folder: 4 plates.
Group selector: Manual group selection for 1 to 7 sheets.
Counter Modes: Total count, batch count, resettable count.

Output Conveyor Options:

Version 1—with shingling output conveyor/stacker
Version 2—with intelligent transfer conveyor interface to gripper arm of inserter's insert station.
Version 3—with a buffering, intelligent transfer conveyor interfaces to an open feed station of inserter The GBR 438-3 can also convert an intelligent, continuous form mail inserting system to a cut sheet operation.
Controller: Adjustable operator's panel with readout and touch screen access to all system functions. System is microprocessor controlled with self-diagnostics and error display including double, misfeed, and jam detection.

Electrical Service

208 volts, 3 phase-Y, 20 amp,	4 pole, 5 wire grounding - use NEMA L21-20R
220 volts, 1 phase, 20 amp,	3 pole, 4 wire grounding - use NEMA L14-20R
1,000 BTU/hr	
Fuse List - Refer to Section D10	

Dimensions (includes feeder, accumulator, folder, and transfer conveyor)

Length: 106" (mm)
Width: 26" (mm)
Height: 58" (mm)
Weight: Net approx. 725 lbs. (kg)

Read Options

Line Code (B+H or GBR)
Bar Code

A.5   RUN SCREEN

This screen is displayed continuously for informational purposes until "Test" or "Setup" is selected.

-See Section A7 for "**Setup**" Screens
-See Section C Problem Analysis" for "**Test**" screens.

- **Run** -
- **Test** – Press to enter diagnostic screens (for more information, refer to Section C).
- **Setup** – Press to enter setup screens (for more information, refer to Section A7).
- **Release Brakes –** Releases/Applies Accumulator and Feed Brakes to allow jam clearing.

Information Displayed:
- **Revision** (Software) and **Build Date** – top line
- **Packages** – Total package counter. Reset in **System Setup**. Also resets during bootup.
- **Sheet –** Displays the # of sheets in the accumulator.
- **Package Rate** – Used to monitor throughput of the 438. . Calculated at every pack dumped from accumulator (not averaged).
- **Demand Rate**– Displays the package demand rate from the inserter.   Calculated at every demand signal transition (not averaged).
- **Date and Time** - (not functional at this time)
- **EOG** – Displays end of group (ready for dump).
- **Group**
- **Page**
- **Insert Marks**
- **Control Marks**
- **Monitor Events** – Displays event history, however, entire list is lost when power is turned off.
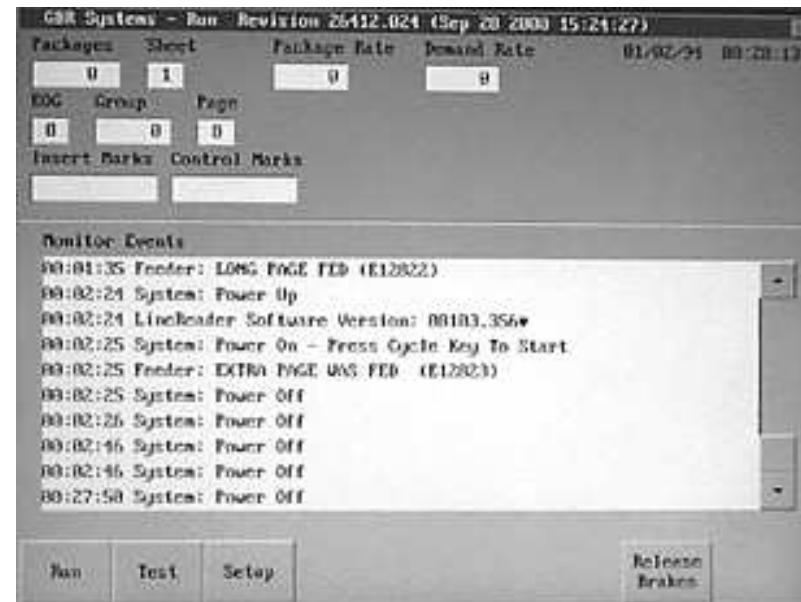
A.6 KEYBOARD OPERATION
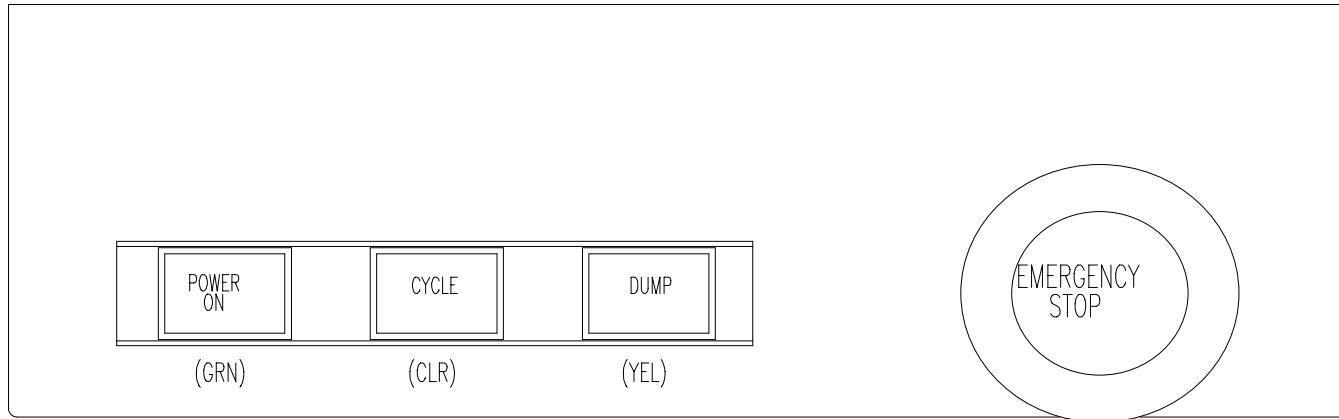
EMERGENCY STOP

> Press to shut down all motors on the 438 in emergencies
> Lifting any cover will also shut down all motors on the 438

POWER ON

> Press to start all motors and enter ready mode
> Press while in ready mode to shut down the 438

CYCLE

> Press quickly to feed one sheet
> - Repeat until **EOG** on display is "1", **DUMP**
> Press and hold **CYCLE** to start continuous feeding

DUMP

> Press after manually filling the accumulator to discharge package into the folder

A.7 SETUP SCREENS

Press **Setup** while in the **Run** screen.
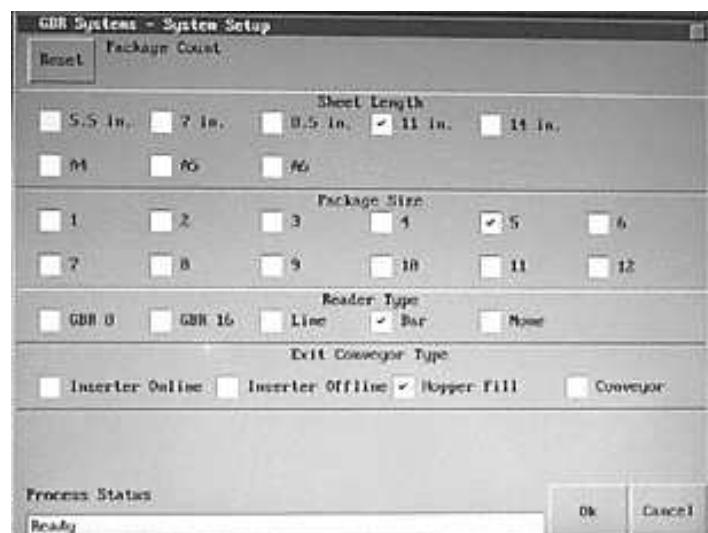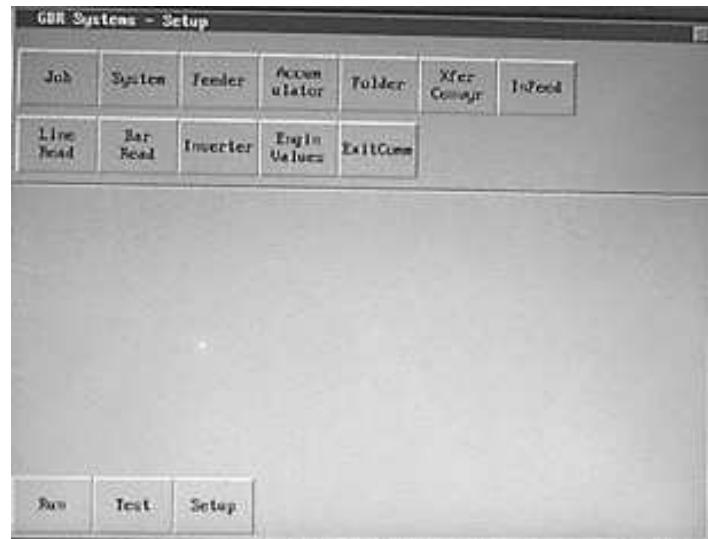
This screen provides access to all 438 setup screens.
Press **Run** to return to the "Run" screen.

Note: Normal factory settings are in bold font.

A.7a Job – (not functional at this time).

A.7b System

Package Count Reset

Sheet Length
- 5.5(NT), 7(NT), 8.5, **11**, A4(NT), A5(NT), A6(NT)

Package Size
- Max Pages in Accumulator. 1 to 12
- For Read, 1 greater than max expected (5 for the LineCode test set). Or number of fixed pages with no read.

Reader Type.
- GBR 8. (NA), GBR 16. (NA), Line, Bar, None/Off. Fixed packs. See Package Size.

Exit Conveyor Type
- Inserter Online. By demand. See Inserter Setup 1 for Open or Gripper setup.
- Inserter Offline. Selecting this allows the inserter to run independent of the 438 without physically detaching.
- Hopper Fill. Select "HOPPER FILL" when the inserter will be taking the folded documents from a hopper. With or without demand. See Eng. Value 20. With no Inserter.
- Conveyor. with or without demand. See Eng. Value 20. With no Transfer Conveyor (Xcvy). Exit at Folder with Folder Exit Sensor.

- Use when "Timed" is selected
- Higher the number, the larger the gap between sheets.

A.7c   Feeder Setup
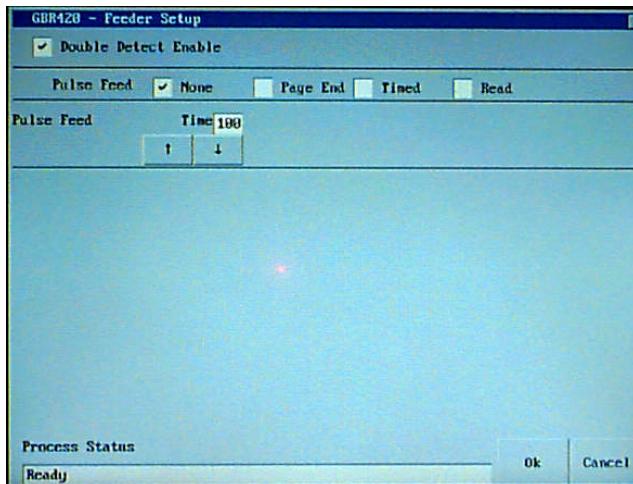
Double Detect Enable
- Select to have the 438 detect double feeds.
- Deselect if paper stock is causing false double detects.

Pulse Feed
- Deselect to engage clutch for the entire pack. AKA "Stream Feed".
- When selected the feeder will place a larger gap between the sheets.

Page End.
- Clutch is off at lead edge of page, on again at trail edge of page.

Timed
- "Pulse Feed Time" must be set when using this option.
- Clutch is off at lead edge of page, on after Time(for Timed).

Read
- Clutch is off at lead edge of page, on after read received.

Pulse Feed Time

A.7d   Accumulator
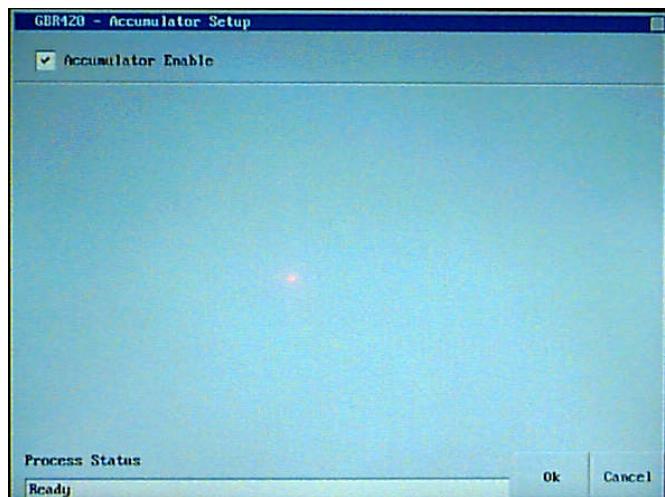
- Leave selected (not functional at this time).

A.7e   Folder

Folder Enable
- Leave selected (not functional at this time).
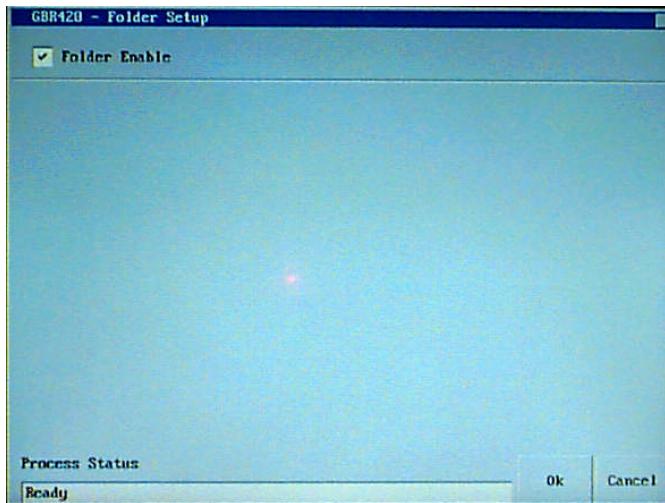
A.7f   Xfer Cvyr (Transfer Conveyor)
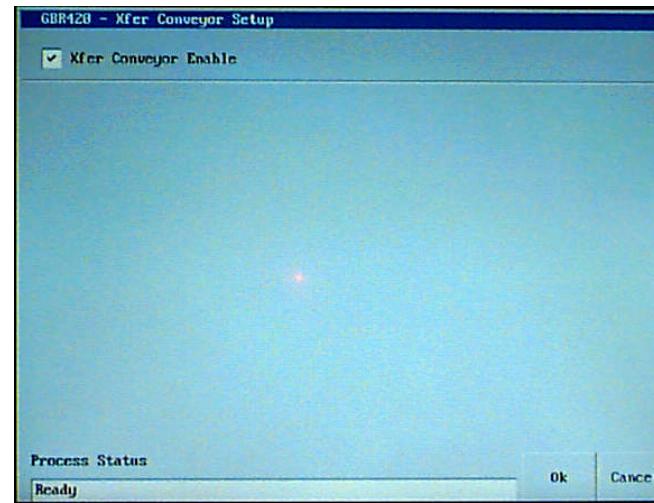
Xfer Conveyor Enable
- Leave selected (not functional at this time).

A.7g   Infeed
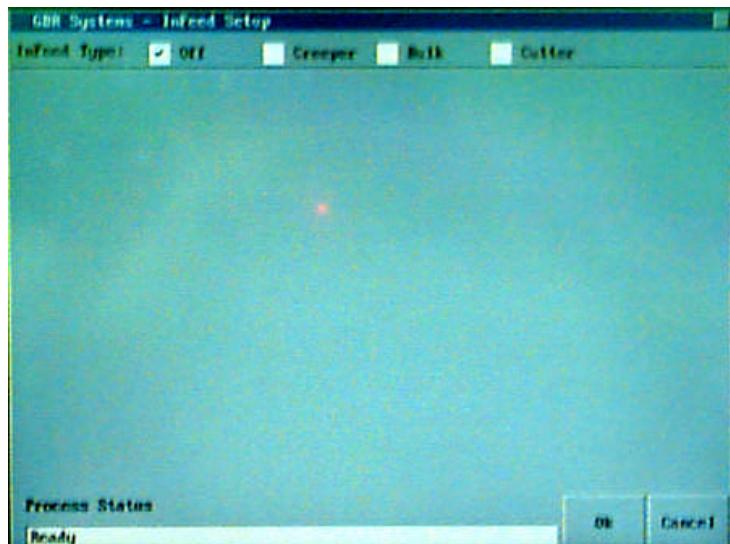
A.7h   Line Read Setup 0
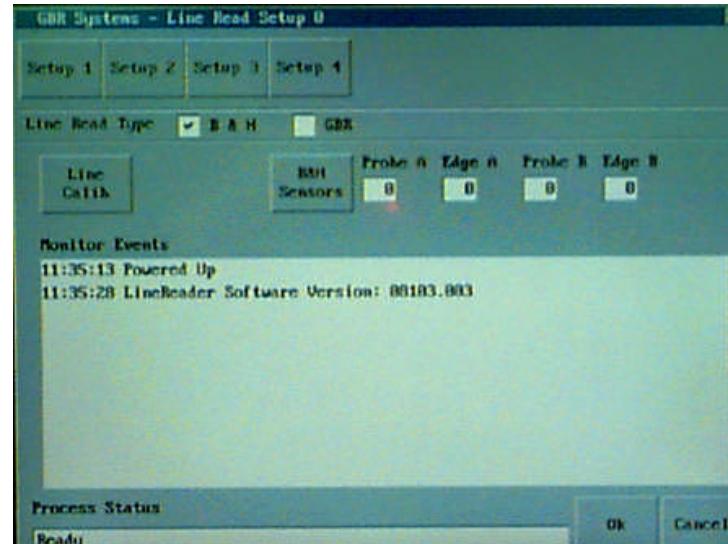
Select the type of infeed:

Off

Creeper
- Select when using the standard 2000 sheet creeper conveyor.

Bulk
- 470 type bulk loader with on/off control by software monitoring the paper demand switch.

Cutter. (NA)

Note: Refer to Section A8 for an explanation of GBR Line Code Read.

Setup 1 – Refer to Section A.8c
Setup 2 – Refer to Section A.8c
Setup 3 – Refer to Section A.8c
Setup 4 – Refer to Section A.8c

Select Line Read Type:
   B&H Read
   GBR Read

A.7i   Bar Read Setup

Refer to Section A.9d for setup information.

- **Home** – Encoder Updated as Inserter runs.
- **Event List**

A.7j   Inserter
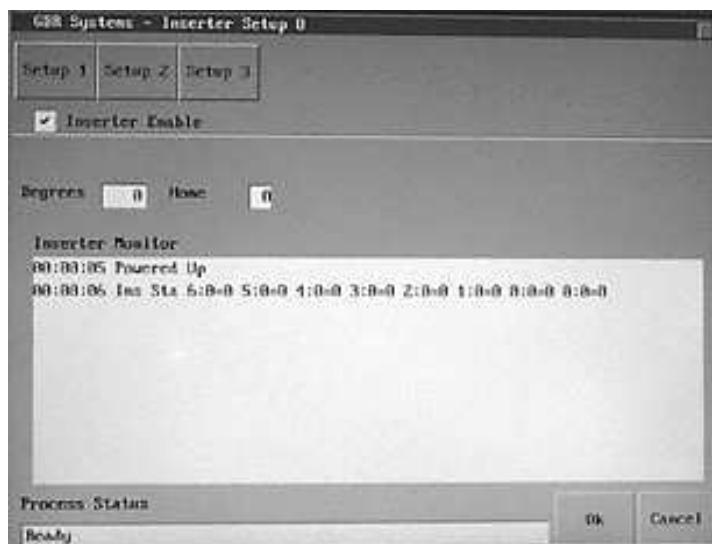
- **Setup 1**
- **Setup 2**
- **Setup 3**
- **Inserter Enable**
- **Degrees** – Encoder Updated as Inserter runs.

Inserter Setup 1
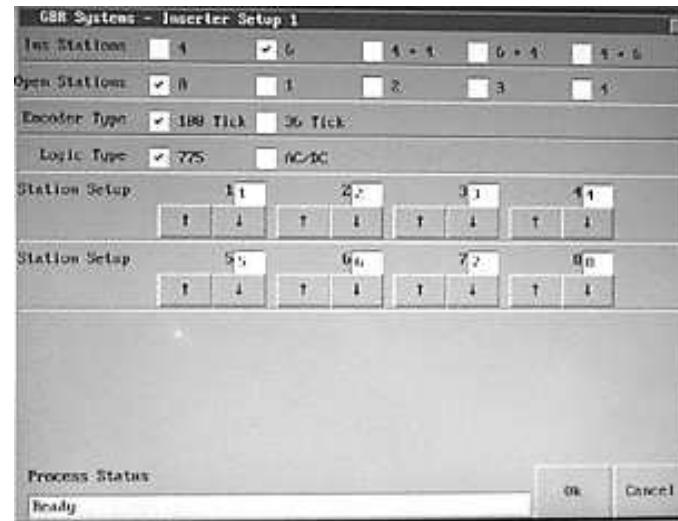
Ins Stations
- 4, 6, 4+4, 6+4, 4+6 Choose Inserter configuration.

Open Stations
- Select "0" for GRIPPER, "1" - "4" for Open feed.
- Normally set to "GRIPPER" (Inserter takes the folded document from the 438)
- Select "OPEN FEED" when the 438 will be placing the folded documents directly on the inserter track. When using open feed, selected number represents the number of stations prior to the first insert station the package was placed.

Encoder Type
- 100 Tick or 36 Tick

Logic Type

- 775 – 420/438 control of 775 Inserter functions, station Select, Envelope Disable, Envelope Flap Detect Disable, InkMark, Divert, Postal Meters.
- AC/DC – 420/438 control of non-775 Inserter functions, station Select, Envelope Disable, Envelope Flap Detect Disable, InkMark, Divert, Postal Meters.
- Station Setup 1-4
- Station Setup 5-8

Station Setup

Note: Insert Station positions are referenced from the station at which the documents are inserted into the envelope ("Insert Sta: 0"). Insert Station 1 would be the station downstream from Insert Station 0. Insert Station -1 is the Insert Station upstream from Insert Sta 0.

Inserter Setup 2
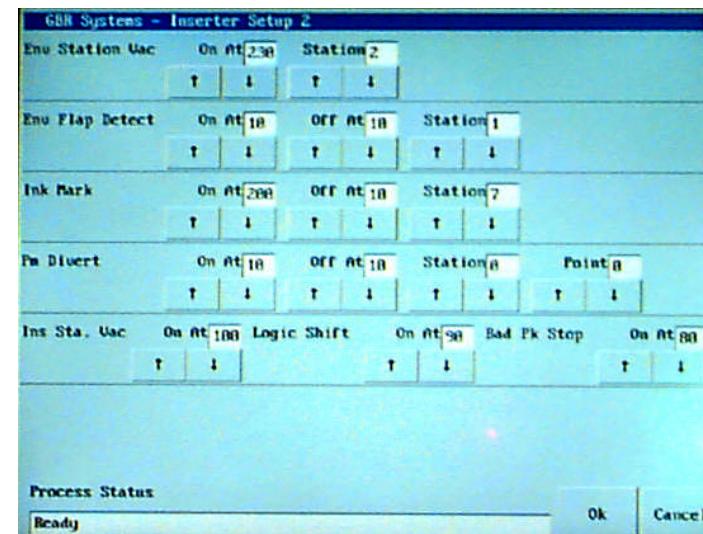
Envelope Station Vacuum is normally enabled at "230". This is the position of the encoder (in degrees) at which vacuum is applied to the envelope hopper. Insert Sta -: is normally set at -2.

Envelope Flap Detect is normally set On at: 010, Off at: 350, and Insert Sta -:1(this is the location of the flap detect).

Ink Mark is an optional device that places an ink mark in varying locations to sort zip codes visually. "OFF" is the number of chain movements AFTER envelope insertion. Ink Marking is normally located at Station 7.

Insert Station Vacuum is normally enabled at "100". This is the position of the encoder (in degrees) at which vacuum is applied to the insert station.

Logical Shift is normally set to "On At:: 90". This is used to carry the data with the physical document.

Bad Package Stop is normally set to "On At:: 80".

PM Divert, Postal Meter 2, and Postal Meter 3

NOTE ON POSTAL METER WEIGHING: The 438 can accommodate up to three postal meters (PM Divert 2 and 3 are located in Inserter Setup 3). Based on the values entered in "Weight Breaks", "Page Env Wts", "Ins 1-4 Wts", and "Ins 5-8 Wts" (located in Inserter Setup 3) the document will be stamped by the appropriate postal meter. The dollar value must be manually entered in the postal meter.

The value you enter in the Postal Meter Weights can be any unit of measure as long as it is consistent. If one weight break is set to reflect ounces, all other settings must reflect ounces including the inserts and the postal meter itself. Likewise, if one is set to reflect grams, they must all be set to reflect grams. The numbers entered are relevant only to each other.

Postal Meter 1 (PM Divert in Inserter Setup 2) is normally set to "ON at: 200". This will enable the postal meter at the correct time. This value may need to be adjusted if the postal meter doesn't place the postage in the correct place. **Postal Meter 2** (found in Inserter Setup 3) should then be set to 40 higher than the new meter 1 value and **Postal Meter 3** should be 40 higher than 2.

"OFF at: xx" should be set to "10" for all three.

"Station: 0" is set to the value of the last chain section of the inserter after the envelope stuffer and the turnover (04, 05, 06, 07, etc.), this is normally set to "07" on a six station inserter.

"Point :xx" selects the postal meter output line to the 438, this is normally set to "0" for PM Divert, "1" for Postal Meter 2, and "2" for Postal Meter 3.

Weight Breaks

The 438 will total the weights of all documents, inserts, and the envelope and then send it to the correct postal meter. Because you are setting the weight breaks as well as the envelope, page, and insert weights it is important to keep the unit of weight (i.e. oz) consistent.

1 / 2 Enter the Weight Break of Postal Meter 1 to Postal Meter 2.
2 / 3 Enter the Weight Break of Postal Meter 2 to Postal Meter 3.

Page Env Wts

Page

Enter the weight of the individual page, the 438 will sum the weight of all pages automatically.

Env

Enter the weight of an individual envelope.

Ins 1-4 Wts and Ins 5-8 Wts

Enter the weight of each insert in stations 1-4 and stations 5-8.

Inserter Setup 3
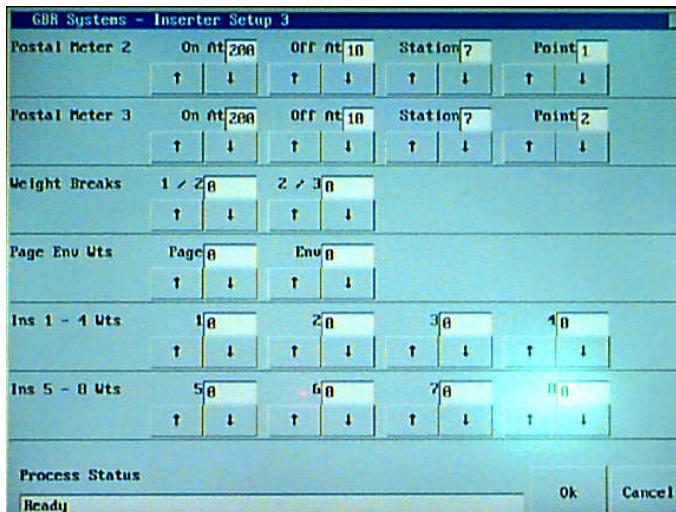
Refer to Section H.4 for an example of a Typical Postal Metering Setup Preset.

A.7k   Engineering Values (Password Protected)

Number

Value

For settings refer to Section H Misc. for the Engineering Values List.

A.7l   ExitComm
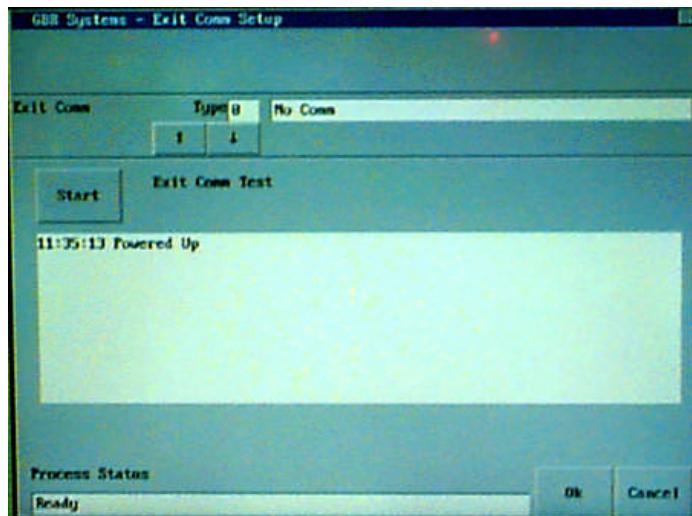
Type
  0 No Comm
  1 RR Donnelly 1
  2 RR Donnelly 2
  3 Pinnacle 1
  4 Pinnacle 2
  5 General
  6 Tampa 1
  7 Zaandam 1

Start Button
   – Xmits test data in type selected. Displays response terminated by a CR, LF. Press again to stop.

Event List

A.8   GBR LINE CODE READ SYSTEMS OPTION

A.8a   Introduction

The Line Code Recognition System is capable of decoding line code marks that are on 1/10", 1/8" or 1/6" spacing. There can be as many as 25 mark locations in a bank with a possibility of two banks per each channel of Line Code marks.

A Single Line Code Recognition card supports input information from two probes. The second probe is an optional feature. The system is limited to having only one of the two probes active at any one time. If more than one channel of Line Code marks is required to be recognized on a single document, each additional channel requires another Line Code Recognition system.

The GBR Line Code reader contains an intelligent analog section that reads GBR line code. It consists of an 8051 GBR Line Code Reader Card (STD 80), an SBX Reader Card (TJ Board) an encoder and one or two fiber optic read probes. The intelligent analog section allows the reader to be setup through the 438's touchscreen.

The GBR Line Code reader uses an analog signal to read code as it passes by the fiber optic sensor. The reader board is 'intelligent' because the variables used to generate this analog signal are not hardwired into memory, but can be modified through software. The reader can be adjusted to account for variables such as:

- Paper color changing from job to job
- Code not being printed to specification resulting in more reliable reading from the 438.

Reader Board Values that can be Adjusted Through The 438 Touchscreen

Refer to "Line Read Setup 4".
- **GAIN -** controls the amplitude of the 0-5 volt analog signal.
- **OFFSET #1 -** controls the initial DC voltage added to the analog signal to catch the lead edge of the page.
- **OFFSET #2 -** controls the DC voltage added to the analog signal when reading the code.
- **LAMP -** controls the brightness of the reader probe.
- **TRIP POINT #1 -** controls the voltage level at which an interrupt will be generated in a low-to-high voltage transition.
- **TRIP POINT #2 -** controls the voltage level at which an interrupt will be generated in a high-to-low voltage transition.

A.8b   Setting Up the GBR Line Code Reader

Setting the Probe

The most critical area of adjustment is the read sensor focus. The mechanical position of the read sensor must be adjusted to obtain the proper size and focus of the light emitted from the read sensor. Without the proper focus the read sensor cannot accurately interpret the GBR line code.

1.   Position the read head assembly to aim the light through the hole in the paper guide rail. The lowest point on the read head should be 1/2 to 5/8 inch away from the paper surface.

2.   Place a document with the GBR line code near the light from the read sensor.

3.   Turn the read lamp on: Go to: SETUP>LINE READ>LINE READ SETUP 4. Enter LAMP SETTING: 255 by pressing the + or - keys.

4.   Loosen the read sensor locking screw and push the read sensor completely into the housing. Observe the light beam image. It should be centered on the hole in the rail and appear to be out of focus; as it is drawn out of the housing the image will appear to come more and more into focus. Proper focus is obtained when the image is at its smallest size and a very slight halo appears around it. The width of the light beam image on the paper (not including the halo) should be equal to the width of a solid bar: 0.020 inch (+/- 0.003") and 1/4 to 3/8 inch long.
        Rotating the read sensor while adjusting the focus will permit the image to be set parallel to the code block marks. Set the light beam image parallel to the lines of the code block before tightening the read sensor locking screw.

5.   Before leaving the read sensor adjustments, make sure that the light beam is centered on the code block printed on the document. Code block movement from side to side, due to print quality or paper size

variations may cause the read sensor to see only partial code resulting in a read error.
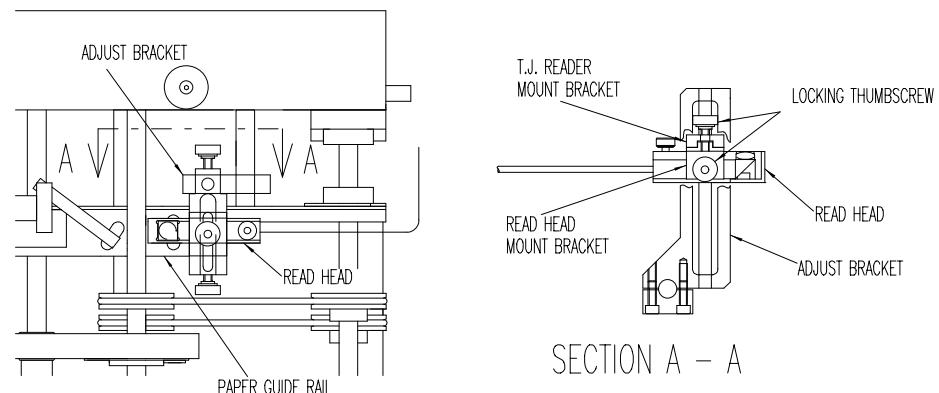
Read Probe Assembly Figure

A.8c   438 Line Read Setup Screens

Line Read Setup 1

("Setup" > "Line Read" > "Setup 1")
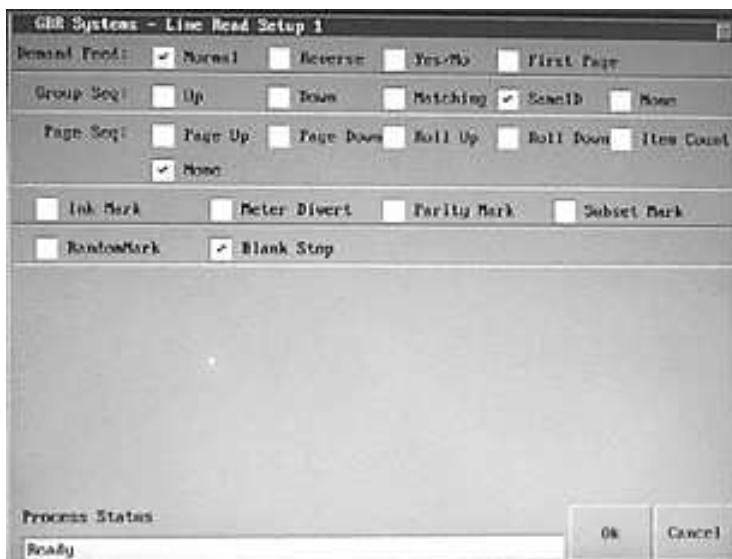
DEMAND FEED

NORMAL - The machine will demand feed on the absence of an End Of Group mark. This means the only page in a set that has the mark is the last one.

REVERSE - The machine will demand feed on the presence of the End Of Group mark. This means that all pages in the set will have the mark except the last one.

YES/NO - Used where all pages have a mark. Each page will have an End of Group or a NOT End Of Group mark. The machine will demand feed on EOG, but all other documents in the set should have the NOT EOG mark.

LAST PAGE - When this option is selected, the system looks for the end of group mark (demand feed) on the last page of a set to be fed into the accumulator. This option is intended for use with page sequencing configured as "down".

Press "Cancel" to void any changes made to this screen or "Ok" to set the changes and return to the "Line Read Setup 0" screen.

GROUP SEQUENCE

UP - Choose if the group is counted UPward. (1, 2, 3, 4). Sets must be in order.

DOWN - Choose if the group is counted DOWNward. (4, 3, 2, 1). Sets must be in order.

MATCHING - will match marks within a set. All marks in the set must be the same. Sets may be in random order.

SAME ID -

NONE - No group sequence.

The purpose of the Group Set mark is to ensure pages from two different packages do not get processed in a single package. Group Set marks must be present when using GROUP SEQUENCING.

PAGE SEQUENCE

PAGE UP - Choose if the page is counted UP (1, 2, 3, 4).

PAGE DOWN - Choose if the page is counted DOWN (4, 3, 2, 1).

ROLL UP - Cycle counts up sequentially to a selectable value set in "Line Read Setup 3 (Group Seq and Page Seq - Min and Max)

ROLL DOWN - Cycle counts down sequentially from a selectable value set in "Line Read Setup 3 (Group Seq and Page Seq - Min and Max)

ITEM COUNT - Choose when the first sheet in a package indicates the total number of sheets in that package.

NONE- No page sequence.

There is a limit of three Page-Sequence marks. Their purpose is to give an individual identity to each page within the package. The maximum number of pages in a package is seven. Page-Sequence marks must be present when using PAGE SEQUENCING.

Ink Mark

Meter Divert

Parity Mark

Not available at this time.

Subset Mark

The limit of sheets into the accumulator is seven. Subset is a special line in the code that is used to indicate whether a set is more than seven pages. When the package is more than seven pages the machine will use the subset line to break the total page count into the amount of packages necessary to complete the total count. This prevents possible damage to the folder from packages greater than seven pages. The set and subset will go out in different envelopes.

Random Mark

Blank Stop

Press "OK"

Line Read Setup 2

("Setup" > "Line Read" > "Setup 2")

No. Windows
Currently this must be set to 1.

Lines / Inch
The code marks can be at 1/6, 1/8, or 1/10 inch spacing. This is 6, 8, or 10 lines per inch. There can be as many as 25 mark locations in a bank.

EXAMPLE
        GRV
        EOG
        GS1
        GS2
        GS4
        GS8
        PS1
        PS2
        PS4
        PAR

NOTE: Presence of a bar is binary 1, and the absence of a bar is binary 0.

The GRV mark must be located in the first position. The EOG, PAR, GSn, and PSn marks may be shifted in the bank of marks. The GS grouping and the PS grouping must be located as sets, however.

Probes A/B
Select the reading probe to be used.
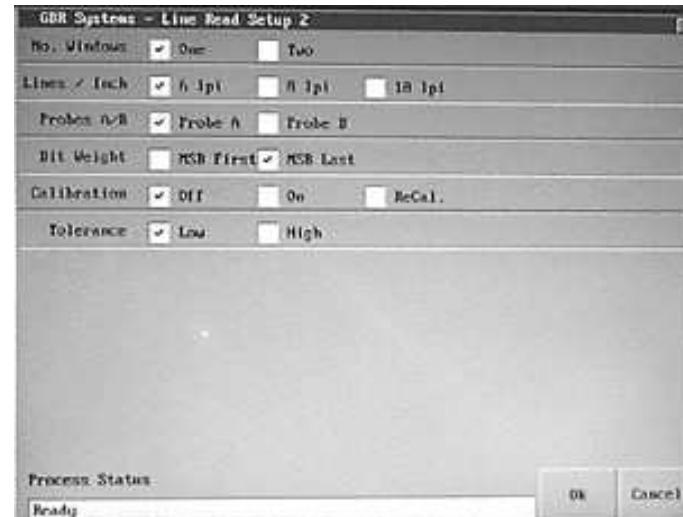
Bit Weight
Page and Group marks can be arranged as Most Significant Bit First (MSB) or Most Significant Bit Last.

MSB First is the first bit encountered when reading.
MSB Last is the last bit encountered when reading

Example MSB Last	Example MSB First
GRV	GRV
EOG	EOG
GS1	GS8
GS2	GS4
GS4	GS2
GS8	GS1
PS1	PS4

PS2   PS2
PS4   PS1
PAR   PAR

Calibration

NOTE: Calibration is normally to be used by the service technician only. See section "GBR Line Code Read" for related information.

The Line Code Recognition system can be calibrated to the particular machine in which it is installed. Calibrating the Line Code Recognition system to the particular machine eliminates parts tolerance problems and provides a method of recalibration once parts have become worn.

Calibration of the machine is provided for 1/10", 1/8" and 1/6" code spacing. There is a different calibration number stored in battery backed memory for each type of code spacing. This means a machine must be calibrated when the proper line code spacing is selected. Once a machine has been calibrated for 1/6", 1/8", or 1/10" spaced codes it will operate properly until the parts on the machine become severely worn.

The machine is calibrated by running a special Calibration sheet through the machine. The Calibration document has two precisely placed marks on the document. These marks provide the needed reference points to calibrate the machine. The same sheet is used for all three settings.

Description Of A Calibration Document

A Calibration document has two precisely placed Line Code marks on a document. The first Line Code mark is placed one inch from the leading edge of the document. The second Line Code mark needs to be precisely placed 6 inches away from the first Line Code mark. No other marks can be in the area between the two marks. This will give the Line Code Recognition system the expected reference distance to calibrate to the machine. The Line Code Recognition card uses the two marks on the Calibration document to count the number of encoder signals which occur between the marks. If the number of encoder signals counted are within 15 % of the expected number of encoder signals, it is considered a valid calibration value.

Calibration Procedure

FOR 1/10", 1/8" AND 1/6" SPACED LINE CODES

1) Check all mechanical setups in the machine. Examples:
   - Friction feeder is free of mechanical binding
   - Singulator is adjusted properly
   - Documents are processed through machine without distorting the paper
   - All paper hold downs are set up properly
   - Paper rails are set to the proper width

2) Line Read Setup 4 and all preceding Setup 2 must be performed first.

3) Select "Calibration On".

4) Press "OK".

5) Now feed a single Calibration document on the machine.

6) If none of the following errors are declared when a calibration document is fed the Line Code Recognition system is calibrated for the current selected Line Code spacing.

   Errors Indicating A Bad Calibration
   - NO FEED
   - NO GATE MARK DETECTED
   - NO GATE MARK DETECTED IN 2ND BANK
   - CALIBRATION OUT OF RANGE

7) If a bad calibration is indicated RECALIBRATE must be selected before another Calibration document is fed. (Go back to step 4.)

Tolerance

Use LOW setting unless there is not a good contrast between the document background and the function marks. The LOW setting will tolerate some drift in the printer registration. Use of the HIGH setting does not allow drift in the printer registration. The mark location is very critical if the HIGH setting is used. Use it if the contrast between the document and the function marks is poor.

The Line Code Recognition system supports two print line windowing schemes when interpreting a Line Code. The two windowing schemes are High tolerance and Low tolerance reading. Having two windowing schemes permits service personnel to select the windowing scheme which is best suited for the customer's application.

When Low Tolerance read is selected the print line windowing scheme used does not detect paper slippage. This means the integrity of the Line Code information must be ensured by the data fields represented within the code.

A Low Tolerance interpretation of a line code synchronizes the print line windows on the Gate Mark. The Print lines following the Gate Mark are divided into absolute locations. When a mark is detected it is automatically associated with a Print line number. This means the Line Code Recognition system will not look for the standard tolerances applied between Line Code marks.

When High Tolerance read is selected the print line windowing scheme applies the standard tolerance specification between Line Code marks. This makes it likely for paper slippage in the machine to be detected during the interpretation of the Line Code. Detecting paper slippage improves the integrity of the Line Code Recognition process. It also introduces the possibility of more reading errors being created.

A High Tolerance interpretation of a line code synchronizes the print line windows on the Gate Mark. The Print lines following the Gate Mark are divided into zones of 1/2 print lines. Centered around the expected location of every Line Code Mark is a 1/2 print line zone where the Line Code mark is expected to be detected. Between two Line Code marks there is a 1/2 print

line zone where a mark can not be detected without creating an error. This ensures that all Line Code marks are exactly where they are expected.

Press "OK"

Line Read Setup 3

("Setup" > "Line Read" > "Setup 3")
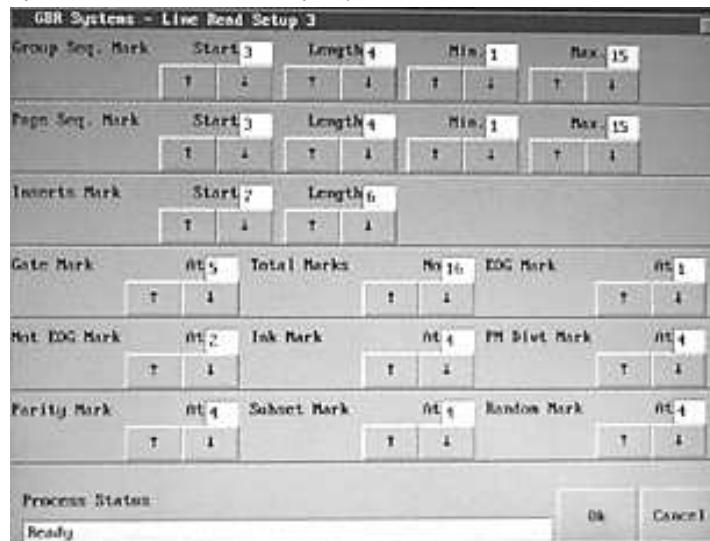
The reader must be told at what point in a code field it will see page, group, parity, and inserts. Depending on the code format this indicates when the field begins, how many lines it consists of, and the maximum value of the field.

This is crucial to proper reading, and the operator should have a master code template that shows the location and value of each line in a code field. If certain fields are omitted, enter an arbitrary number not related to the specific code in that field.

Example: Where the code is page field first, and there are three lines for the page field the correct set-up would be Begin: 01 Length: 03 Max value: 7

Group Seq. Mark

Purpose - Identify each page as being a part of an individual package. The sequential incrementing of the number ensures the document's printed sequence is maintained.

Usage - It is interpreted as a binary number. This number must be constant for all the pages within a package. This number should sequentially increment from package to package (when sequentially counting sheets upward). This number sequentially counts from 0 to 15.

Page Seq. Mark

Purpose - Identify each individual page within a package. The sequential incrementing of the number ensures the documents are assembled in the proper order.

Usage - It is interpreted as a binary number. This number sequentially counts from one to as high as seven.

Inserts Mark

Gate Mark

Location - First OMR mark within a bank (always present)

Purpose - Indicates the start of an OMR code

Usage - synchronizes the OMR system to interpret the remaining OMR marks in the code.

Total Marks

EOG Mark

Purpose - Controls the size of dynamic packages by indicating the end of a group.

Usage - A solid bar is placed in this location on the page with the largest page ID number. All other pages within a group should have no mark in this area.

Not EOG Mark

Ink Mark

PM Divt Mark

Postal Meter Divert Mark

Parity Mark (not available at this time)

Purpose - Adds parity error checking to the code

Usage - This location is used to maintain an even number of solid marks within a code.

Note: The fields that are marked Optional can be eliminated by operator configuration of the machine. However, when a data field is eliminated package security and integrity suffers.

Subset Mark

Random Mark

Press "OK"

Line Read Setup 4

("Setup" > "Line Read" > "Setup 4")

1) Turn on the 438, press the SETUP button then press the LINE READ button.
2) Select "GBR".
3) Press "OK".
4) Press "LINE READ" again.
5) Press "SETUP 4".
   a) Take a piece of the stock that is going to be run through the machine and hand feed it until the light beam is on a white portion of the paper.
   b) Press "WHITE". The system will indicate that when it is done.
6) Press "BLACK" and slowly move the paper until a black bar is under the light.
7) Press "BLACK" a second time when the voltage reaches "0" (the black bar is directly under the light)
8) Remove the paper from under the light and press "TRIP".
   a) Event list will say finished when done.
      - TRIP POINT #1 value should be between 40 and 150
      - OFFSET #1 should be between 100 and 250.

If these values are not obtained, go to section A.8b and reset the probe.

9) Find the average of the recorded OFFSET #1 and #2 values.
10) Change OFFSET #1 and #2 value to this average value by pressing the + or - keys. (example: OFFSET 1 = 129, OFFSET 2= 111, average =120, set both OFFSET 1 and 2 =120)
11) Change GAIN to 0.
12) Record these settings in the area to the right. In the future this procedure can be eliminated by entering these values directly.
13) Press "APPLY" to download these parameters to the read system and then press "OK".
14) The reader setup is complete. Line Read screens "SETUP 1, 2, and 3" must be completed before running paper.

NOTE: When switching between probes or after the 438 has been switched off, it may be necessary to repeat this setup procedure.
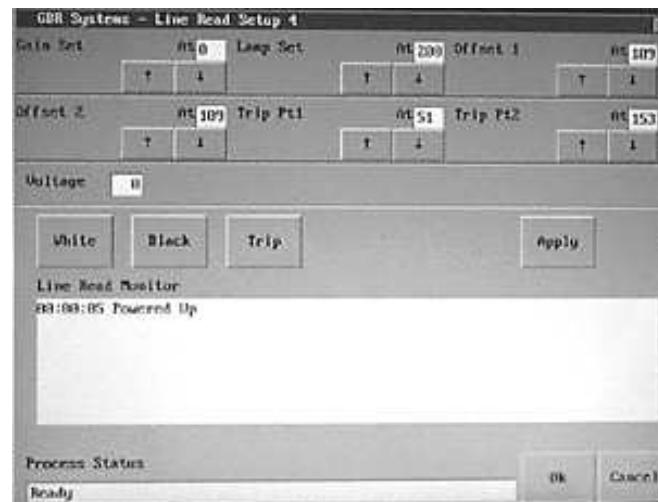
NOTE VALUES FOR FUTURE REFERENCE
(To find the values, go to "Setup" > "Line Read" > "Setup 4" and write down the values listed there)

GAIN: _____

OFFSET #1: _____

OFFSET #2: _____

TRIP POINT #1: _____

TRIP POINT #2: _____

A.8d   Troubleshooting the GBR Line Code Reader

White Level Setup Problems

If you cannot get proper white level setup values do the following:

- Make sure that the probe lamp is bright. If it is not bright follow the instructions in step 3.

- Move the probe closer to the paper and try again. Continue to do this until the probe is nearly touching the paper. If this does not work, the probe might be broken. (Normal setting for the probe is ¾" from the paper.)

Frequent Misreads, Lamp is Bright

If frequent misreads are occurring and the probe lamp is bright, do the following:

- Go to section A.8c and make sure that all of your page settings are properly configured.

- After running one sheet, go into "Setup" > "Line Read" and compare the marks on the page in question to the 1's and 0's on the screen.

- If more 1's appear on the screen than lines on the page, go into "Setup" > "Line Read" > "Setup 4" and increase OFFSET #2 by .1 volts (1 increment). Repeat this step until a good read is obtained.

- If more 0's appear on the screen than lines on the page, go "Setup" > "Line Read" > "Setup 4"   and decrease OFFSET #2 by .1 volts (1 decrement). Repeat this step until a good read is obtained.

- If the correct number of 1's appear, but they appear to have uniformly shifted up or down the page (all the marks shift either a space or two up the page or a space or two down the page), the gate mark is not being found properly. Go to "Setup" > "Line Read" > "Setup 3" and make sure that your read window is set up properly. **Remember, the reader begins looking for the gate mark two lines before the start of your read**

window. If you have a line1/4" above your gate mark (say, your gate mark is at line 15 on the page) and you are set to 1/8" line spacing, unless you set your read window to start 1 line below your gate mark (line 16 on the page), the reader is going to catch the first line as your gate mark. If the correct number of 1's appear, but they seem to have shifted on the page (there are not the proper number of spaces between the 1's), read encoder ticks are being missed. To correct this do the following:

a) Check the read encoder belt for smoothness and firmness.

b) Check the main feed belt and the pullout rollers. Make sure that the paper is not slipping as it is fed from the feeder into the accumulator.

- There should be a significant amount of friction between the paper and the main feed belt. If there is not much friction there, clean the main feed belt (citrus cleaner seems to work well on the main feed belt).

- The pullout rollers (the rollers that are right after the singulator) should be adjusted such that they evenly grip the paper as it moves through. Rip off two strips of paper and place the paper on each side of the pullout rollers. Turn the rollers by hand and make sure that the two pieces of paper feed through evenly. If the paper does not feed through evenly, use the adjustments on the sides of the roller shaft to adjust the rollers.

Lamp is Not Bright

If the probe lamp is not bright, do the following:

- Look at the probe in question and determine if it is dim or if there is no light coming from it. If it is dim, you probably have the wrong probe selected. If there is no light coming from the probe, the lamp on the reader board is probably burned out.

- Go into "Setup" > "Line Read" > "Setup 4" and set the LAMP value to 255. Look at the lamp on the other probe (or where the other probe would have been connected on the reader card underneath the machine). If it is brighter than the probe that you are trying to read with than you probably have the wrong probe selected. Go into "Setup" > "Line Read" > "Setup 2" and select the other probe. Exit out of the setup screens. Set up the

Line Code Reader (see Section A..8b **SETTING UP THE GBR LINE CODE READER).**

GBR Line Code Recognition (8051) Board

LED Indicators:

LED1 (top)	Lo to Hi Comparator
LED2	Hi to Lo Comparator
LED3	Probe B
LED4 (bottom)	Probe A

Test Points:

T1	Ground
T2	+5VDC
T3	Probe A Preamp
T4	Probe B Preamp
T5	Lo to Hi Interrupt
T6	Hi to Lo Interrupt
T7	Read Signal
T8	Lo to Hi Comparator
T9	Hi to Lo Comparator
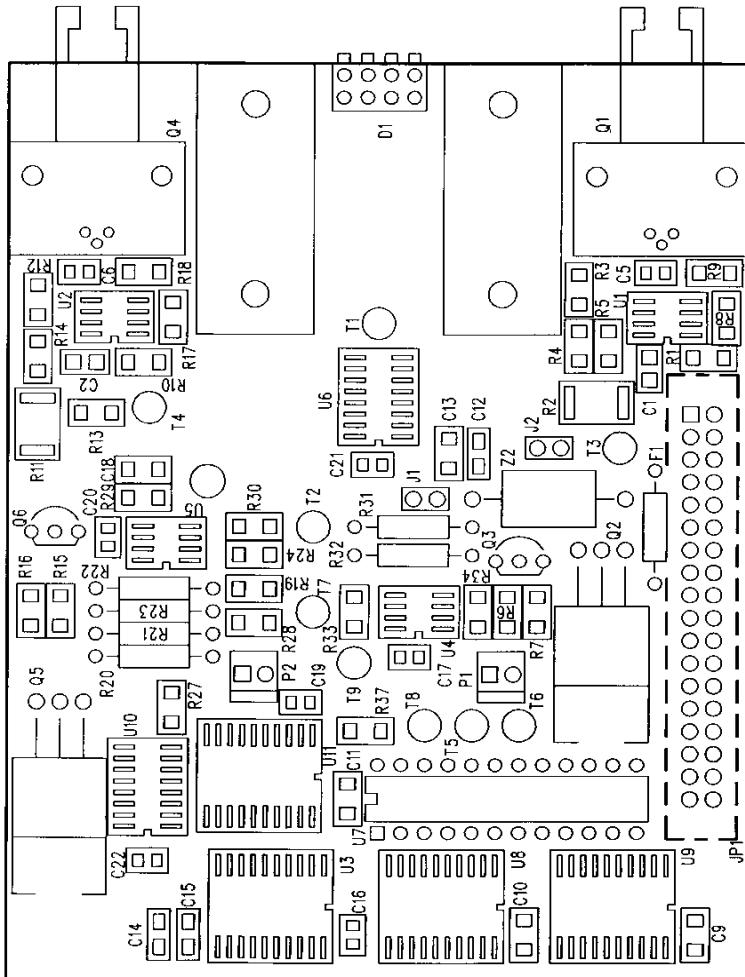
GBR Line Code Board Figure

A.8e   Physical Specifications of the Line Code System

The Print Contrast Ratio should be at least 65%

Mark size specifications: Minimum length of solid mark 0.3" (recommend .5")

Minimum width of solid mark 0.015" (recommend .020")

Maximum width of solid mark 0.030"

Clear area specifications: 0.064" when using 1/8" line spacing and 0.094" when using 1/6" line spacing (minimum clear area between marks taking into account print registration and maximum function line size)

Clear area required on each side of marks 0.2"

Clear area required at the lead edge of the Gate mark 0.332"

Clear area required at the trail edge of the code 0.166"

Code location on paper

Measured from the leading edge of the form the code should be placed on the first 1/3 of the form. The Gate mark registration must be held to +/- 1 print line. (0.125" with 1/8" line spacing) (0.166" with 1/6" line spacing).

The minimum distance of the Gate Mark from the leading edge is 0.25".

All other marks should be placed, with respect to the Gate mark, within a 1/4 of a print line of their expected placement.

A.9   LASER BAR CODE READ OPTION

A.9a   Laser Safety

To prevent possible exposure to laser light that may exceed the CDRH's Accessible Emission Limit for a Class II laser, Your Model 30 has a "Scanning Safeguard" feature, a Laser Shutoff Flip Panel. It shuts off the laser power if the mirror wheel fails to rotate, which ensures that a stationary laser beam cannot exit the scan head. **This is a required feature, and it should not be tampered with. Use only in case of an emergency.**

The radiation level from the laser does not constitute a health hazard. Exercise care to avoid any unnecessary, direct exposure to the eyes. Avoid staring at the light source, since prolonged exposure could result in eye damage. Avoid deliberate eye exposure to the beam. Inadvertent contact, however, is not a cause for alarm.

Any service should be performed so as not to violate compliance with the Code of Federal Regulations, Title 21. Part 1040, Section 10 (21 CFR 1040.10), as administered by the Center for Devices and Radiological Health, a service of the Food and Drug Administration under the Department of Health and Human Services. Do not attempt to defeat any safety provisions.
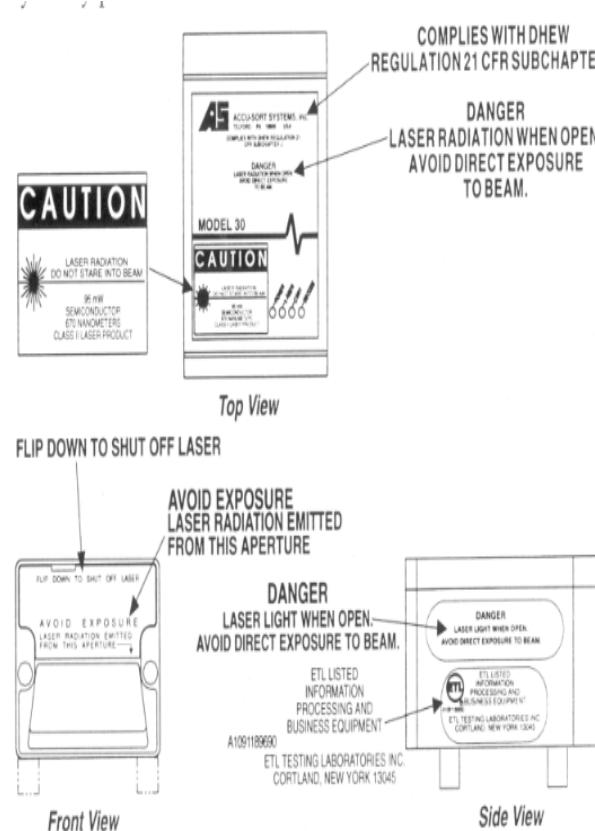
Standard Laser Caution Labels

A.9b   Bar Code Basics

A bar code is a group of rectangular bars and spaces arranged in a preset pattern. The pattern is organized to represent elements of data referred to as characters.   The standard industry codes can represent several alphanumeric characters.

There are many different types of bar codes. Each type uses its own symbology, which defines how the bars and spaces represent the letters and numbers.

The figure below shows each part of a bar code. The labels for each part remain the same even if the position, orientation, or type of bar code changes.
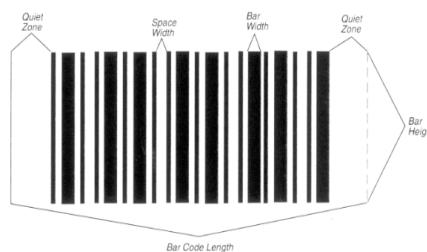
The GBR 438 with the Accu-Sort Model 30 uses the 3 of 9 code or Code 39 - fixed or variable length. This was the first code developed that used both numbers and upper-case letters. It is the most recognized and widely used for non-retail applications. Each character is represented by a stand-alone group of 5 bars and 4 spaces. The basic code set includes 0-9, A-Z, * which is used for the start and stop characters, and six other symbols - . $ / + and

% for a total of 43 characters. Because each of the characters are discrete and self-checking, Code 39 provides a high level of data security.   The Model 30 automatically checks all data for this symbology.

The bar code width must not be printed smaller than 0.010" (.025 mm). Recommended width is 0.015", code height is 3/8 inch. Minimum quiet zone start and end of .25 inches.

Bar coding, sizing, tolerance ratio tolerance per ANSI MH10.8-1983. Print quality must meet or exceed ANSI Grade B per ANSI X3.182, BAR CODE PRINT QUALITY GUIDELINE.

A.9c   Adjusting Your Model 30 Scanner

Your scanner can be mounted in any direction depending on the scheme of your bar codes. **Ladder** orientation refers to a bar code whose bars look like a ladder when facing the bar code's direction of travel. **Picket Fence** appear as a picket fence when facing the direction of travel. Regardless of the direction of travel, the scan line must be perpendicular to the bars.

In some applications, codes are printed on glossy paper or covered with a shiny material such as cellophane. When this happens, it is possible that the code surface reflects so much laser light that it is very difficult for the scan head to decode the bar code.

To avoid reflections from the surface of glossy bar codes do not mount the scan head parallel with the object to be scanned. Mount the scan head at a five to ten degree angle so the laser beam reaches the bar code at a slight angle.

A.9d   Setting the 438 to Read Laser Bar Code

"Setup" > "Bar Read"
Modifications to the bar setups are retained as long as the bar job defaults are not restored or the internal non-volatile storage is not overwritten by a new 'ini' file or is lost.
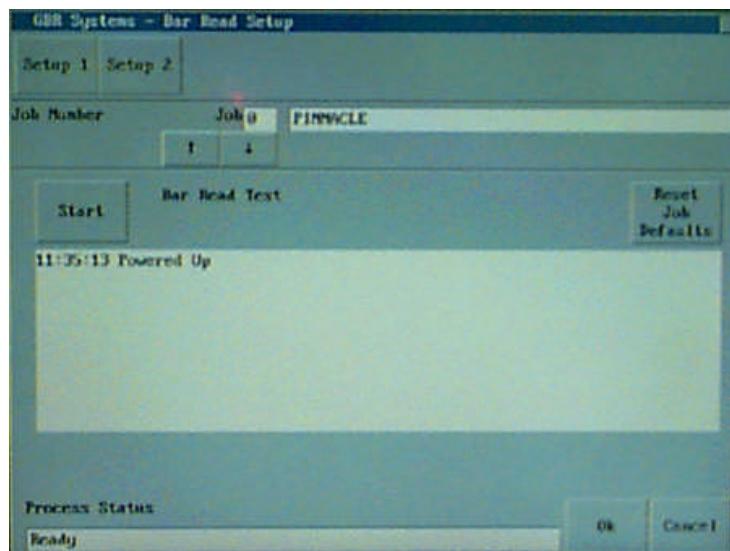
Job

Select the job to run by pressing "↑" or "↓".

Note: If your job is not listed, go the next section "Setup 1" to program it in. Refer to the Appendix in this manual for setup parameters for various jobs. If your job is not listed call the factory.

Start
This will turn the laser on continuously to hand test the lasers positioning. The screen will read **BAR READ:** and an audible beep will sound when the laser reads the code. The results of the read will be shown on the screen.

Reset Job Defaults
Sets the bar job selected to its defaults, erasing any modifications that may have been done in the setups.

Press **OK to set the job**.

Bar Read Setup 1
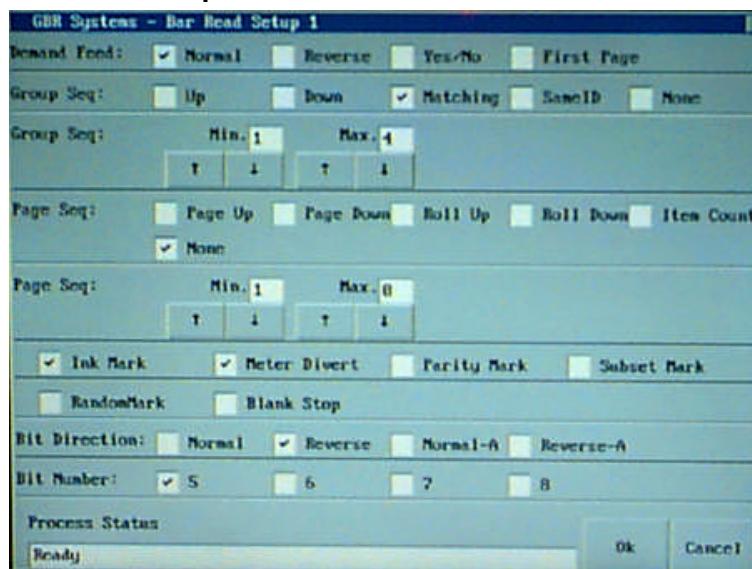
Demand Feed
- Normal – Mark is on the last page fed
- Reverse (NA)
- Yes/No (NA)
- First Page (NA)

Group Seq.
Purpose - Identify each page as being a part of an individual package. The sequential incrementing of the number ensures the document's printed sequence is maintained.
- Up – Match in set. Min to Max to Min
- Down – Match in set. Max to Min to Max
- Matching – Match in set. Must change each set.
- Same ID – Match in set. No change needed
- None
- Min (0 to 1)
- Max (0 to 99999)

Page Seq. Mark
Purpose - Identify each individual page within a package. The sequential incrementing of the number ensures the documents are assembled in the proper order.
- Page Up - Min to Max within sets.
- Page Down - Max to Min within sets.
- Roll Up – Min to Max to Min across sets
- Roll Down – Max to Min to Max across sets
- Item Count (NA)
- None
- Min (0 to 1)
- Max (0 to 999)

Ink Mark
- Mark to drive an ink/zip mark mechanism downstream.

Meter Divert
- Mark to drive a divert mark mechanism downstream.

Parity Mark
(Not functional at this time.)

Purpose - Adds parity error checking to the code
Usage - This location is used to maintain an even number of solid marks within a code.

Note: The fields that are marked Optional can be eliminated by operator configuration of the machine. However, when a data field is eliminated package security and integrity suffers.

Subset Mark (NA)

Random Mark (NA)

Blank Step (NA)

Bit Direction

- Normal

    Count bits 5 to 1, left to right, bit position 4 to 0, follow standard bit position of character.

- Reverse

    Count bits 1 to 5, left to right, bit position 4 to 0.(B&H)

- Normal – A

    For multiple character numeric values. For 5 numeric characters converted to a number, bit positions 16 to 1: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768.

- Reverse – A

    For multiple character numeric values. For 5 numeric characters converted to a number, bit positions 1 to 16: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768.

Bit Number

Establishes the maximum number of bits in one character. This is determined by the type of code being used.

Select from 5 through 8:

5   3 of 9 Bar Code

6-8   not used at this time

Bar Read Setup 2
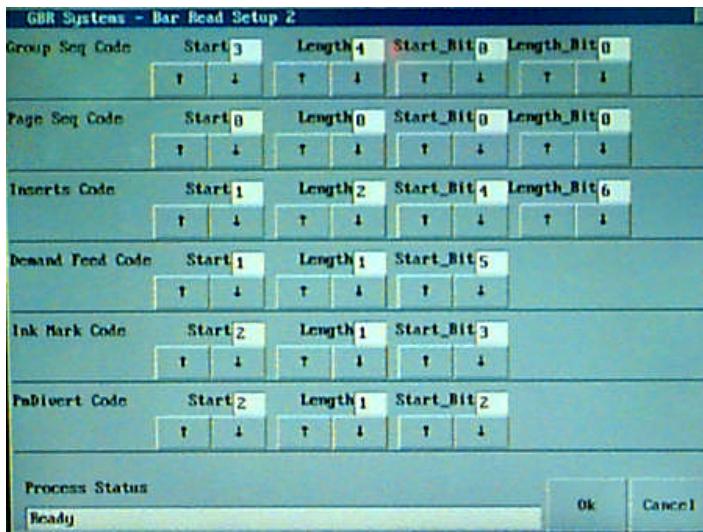
The software permits a total of 30 characters in Bar Read, however, physically that isn't always practical due to the length of the code. For instance, 3 of 9 code is physically larger than 128 code (not available on the 438 at this time). A code in excess of 15 characters becomes problematic with a 3 of 9 code but a 128 code can easily exceed 20 characters.

Define the position in the barcode string to extract the information for the following:

Group Seq Code
- Start (0 to 30). Start character.
- Length (0 to 5). Number of characters.
- Start_Bit (0 to 30). Starting bit position within character.
- Length_Bit (0 to 30). Number of bits.

Page Seq Code
- Start (0 to 30). Start character.
- Length (0 to 3). Number of characters.
- Start_Bit (0 to 30). Starting bit position within character.
- Length_Bit (0 to 30). Number of bits.

Inserts Code
- Start (0 to 30). Start character.
- Length (0 to 20). Number of characters.
- Start_Bit (0 to 30). Starting bit position within character.
- Length_Bit (0 to 30). Number of bits.

Demand Feed Code
- Start (0 to 30). Start character.
- Length (0 to 20). Number of characters. Used with Normal-A or Reverse-A, multiple character numeric values,
- Start_Bit (0 to 20). Starting bit position within character.

Ink Mark Code
- Start (0 to 30). Start character.
- Length (0 to 20). Number of characters. Used with Normal-A or Reverse-A, multiple character numeric values,
- Start_Bit (0 to 20). Starting bit position within character.

PmDivert Code
- Start (0 to 30). Start character.
- Length (0 to 20). Number of characters. Used with Normal-A or Reverse-A, multiple character numeric values,
- Start_Bit (0 to 20). Starting bit position within character.

A.9e Adjusting the Paper Guides

In order for your laser scanner to read the bar code there can be nothing blocking its path. The Paper Guides provided with the Laser Option are custom adjustable for your specific code location.

Place these guides to provide as much support evenly across the paper path as possible without interfering with the lasers path.

SECTION B - PREVENTIVE MAINTENANCE

B.1 TEST EQUIPMENT AND TOOLS

- Fluke Scope Meter
- Standard & Metric Hex Wrenches
- Small Blade Flat Screwdriver
- Philips Head Screwdriver

B.2 GENERAL PROCEDURES

WARNING!
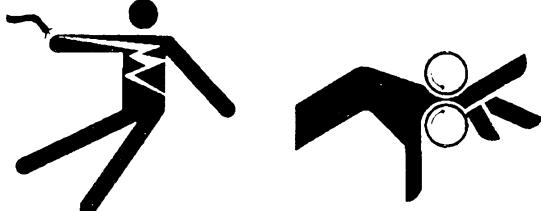
DO NOT ATTEMPT TO CLEAN THE 438 WHEN THE MACHINE IS RUNNING. ATTEMPTING TO DO SO COULD RESULT IN INJURY. BE SURE THAT MACHINE POWER IS OFF AT ALL TIMES WHEN CLEANING.

B2.a CLEANING THE MACHINE

The 438 should be cleaned daily to remove any dirt or dust which may interfere with the operation of the machine. Paper dust collected in motion areas could impede and/or damage integral parts of the folder. Paper dust can also impede read quality if it accumulates on the read heads and paper sensors. Excess dirt or toner build-up (from laser printing) on the feed belts could result in damage to the material and/or premature wear of the feed belts. Therefore, it is important to perform the following daily cleaning instructions:

1. Clean ALL Feed Belts.
2. Remove ALL Paper Dust.
3. Clean the Fold Rollers
4. Clean the Machine Cabinets and Covers.

B2.a1 Cleaning the Fold Rollers

All accumulated paper dust should either be brushed or vacuumed from the 438. Clean all accumulated paper dust from the electronic paper sensors.

B2.a2 Cleaning the Fold Rollers

DO NOT USE ANY LIQUID ON THE FOLD ROLLERS! The fold plates must be removed in order to clean all fold rollers. For

more information on cleaning the fold rollers, refer to your 438 Operator Manual.

B2.a3   Machine Cabinets and Covers

Clean the machine cabinets and covers using a soft damp cloth.

B2.a4   Paper Hopper

The feed belt should be cleaned with a substance such as isopropyl alcohol that does not leave a film. Apply some alcohol to a rag then lightly rub all dirt and film off of the belts.

B2.a5   Singulator

The Singulator must be as clean as possible at all times to insure the proper feeding and singulation of paper by the feed belt. This may be done first making sure that the singulator is not worn. If so, loosen the small set screw on the operator side and rotate the roller to a point where a rounded spot on the roller will contact the paper.

NOTE: If there is no rounded spot available, the singulator needs to be replaced immediately.

Once this is accomplished, raise the singulator roller approximately 3/4" from present setting. Pass an alcohol dampened rag under the bottom of the singulator roller. Be sure that it is making sufficient contact to clean away all dirt and debris from the contact portion of the singulator roller.

B2.b   LUBRICATION

No lubrication is required on the 438.

NOTE: If a mechanical component is out of line or deformed, a small amount of oil may be used as a short term fix (to eliminate noise or binding) until the component can be replaced.

SECTION C - PROBLEM ANALYSIS

C.1 "TEST" SCREEN OPERATION

Diagnosis of the system begins with these tests. If it is found that the displayed information indicates a problem, refer to the schematics in section D or section F.

Speed Test

Pressing the green "Power On" switch on the keyboard will start the feeder and folder motors and display the speeds of the feeder, folder, transfer conveyor, and read encoders.

Touch Setup

Factory use only, cancel to exit screen.
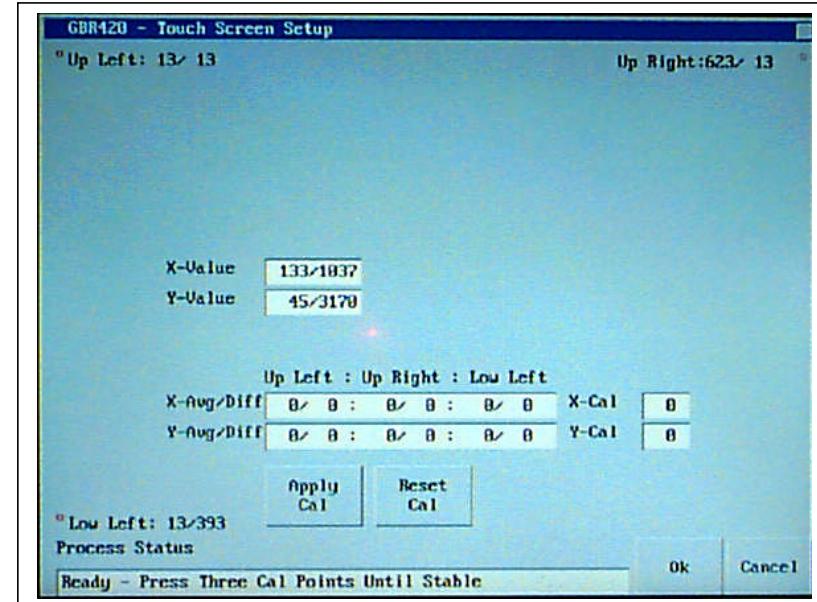
Test Cycle

Press "Test Cycle" for 100 msec On/300 msec Off cycle. Press "Test Cycle" again to stop test.

The speeds indicated are approximate (inches per second).

NOTE: The FEED and READ speeds must be within 5% of each other to ensure normal operational condition.

IO/144 Board (Inputs and Outputs)

- Use this screen to test inputs and outputs.
- The name of the output or input will be displayed when the cursor is positioned on its Opto Rack and Opto Location block.
- Inputs will change state when sensors are blocked or encoders are rotated.
- Use the "Toggle" button to toggle the outputs on and off. (Interlocks must be closed and Master Relay output 1:3 must be toggled ON for this to function.)

Opto Rack

Opto Location on Opto Rack (00 thru 23)

5 VOLT OPTO MODULES

OPTO RACK 0   OPTO RACK 1

(Opto Rack 2 is located on the floor of the cabinet behind Opto Racks 0 and 1)
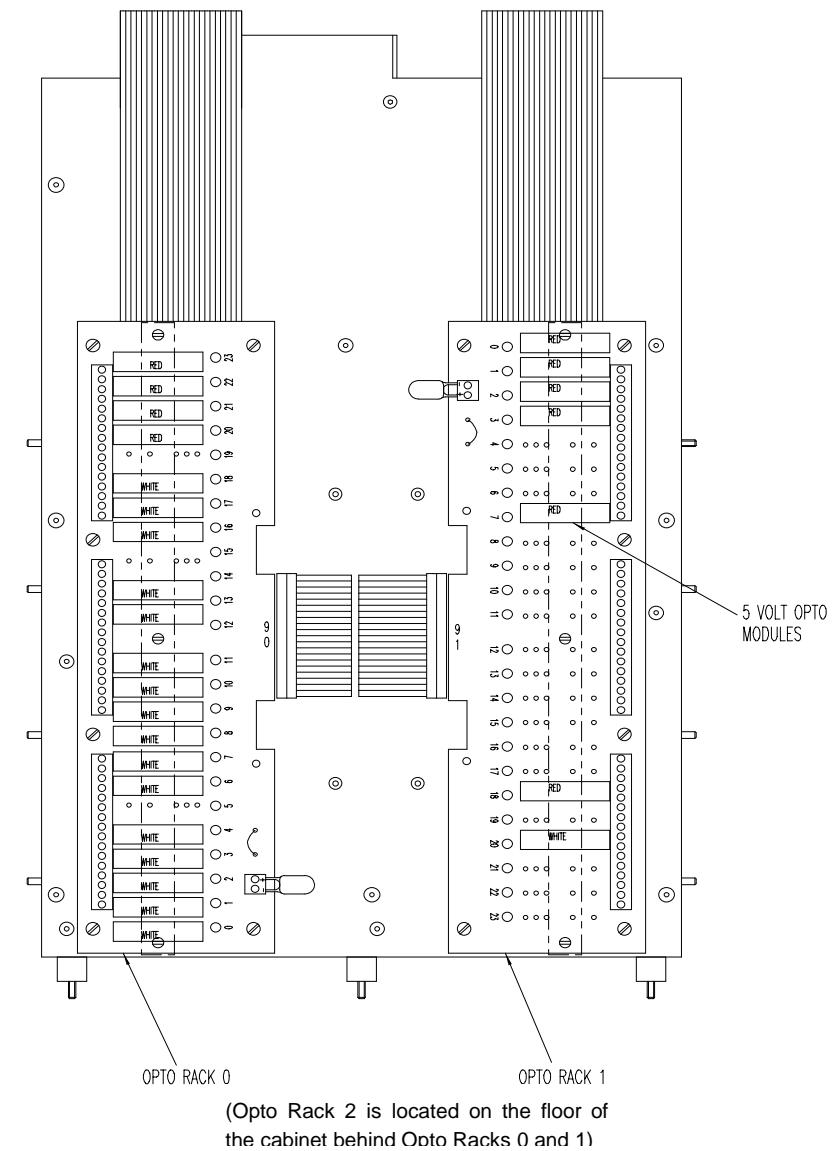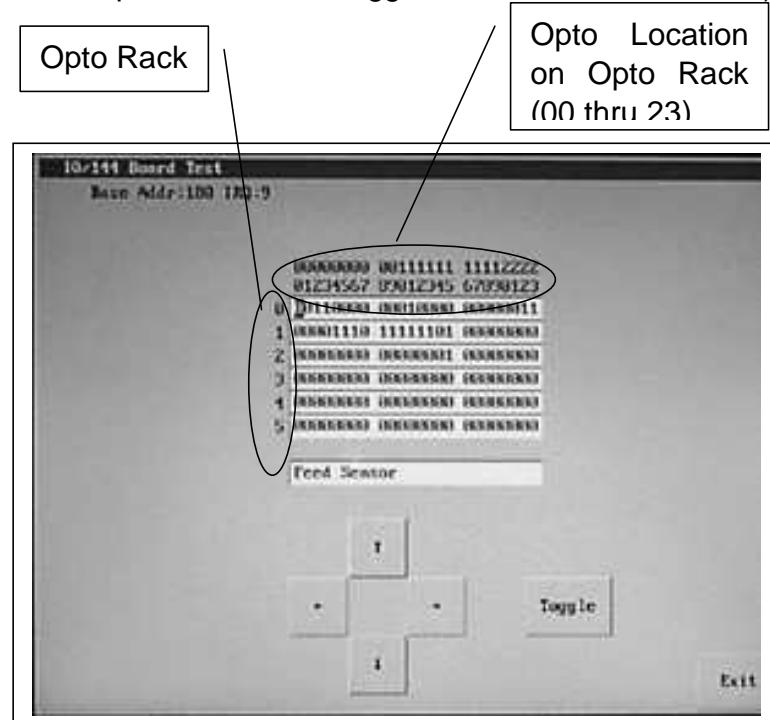
Rack	Opto	Type	
0	00	Input	Feed Sensor
0	01	Input	Stack Sensor
0	02	Input	Feeder Speed Encoder
0	03	Input	Folder Speed Encoder
0	04	Input	Demand Switch
0	05	Input	Inserter Deg. Encoder
0	06	Input	Conv Option Line 0
0	07	Input	Conv Option Line 1
0	08	Input	Key Power
0	09	Input	Key Cycle
0	10	Input	Key Dump
0	11	Input	Interlock
0	12	Input	Transfer Conv IN SNS
0	13	Input	Transfer Conv OUT SNS
0	14	Input	Inserter Home Encoder
0	15	Input	Conv Option Line 2
0	16	Input	2 Sheet Sensor
0	17	Input	Folder Sensor
0	18	Input	Acc Sensor
0	19	Input	Cutter Busy Signal
0	20	Output	Acc Dump Clutch
0	21	Output	Transfer Conv. Clutch
0	22	Output	Transfer Conv. Brake
0	23	Output	Acc Dump Brake

Rack	Opto	Type	
1	00	Output	Feed Clutch
1	01	Output	Folder Motor
1	02	Output	Feed Motor
1	03	Output	Master Relay
1	04	Output	Separation Sol 7 (inserter signal)
1	05	Output	Separation Sol 1 (inserter signal)
1	06	Output	Separation Sol 8 (inserter signal)
1	07	Output	Shingle Conveyor Motor
1	08	Output	Separation Sol 2 (inserter signal)
1	09	Output	Separation Sol 3 (inserter signal)
1	10	Output	Separation Sol 4 (inserter signal)
1	11	Output	Separation Sol 5 (inserter signal)
1	12	Output	Separation Sol 6 (inserter signal)
1	13	Output	Separation Sol Env (inserter signal)
1	14	Output	Ink Mark Solenoid (inserter signal)
1	15	Output	Env Flap Sns Dis (inserter signal)
1	16	Output	Emergency Stop (inserter signal)
1	17	Output	Insert Station 1 Error (inserter signal)
1	18	Output	Paper Hopper Request
1	19	Output	Postal Meter Divert (inserter signal)
1	20	Input	Paper Demand Wand
1	21	Input	Ins. Run Lamp
1	22	Input	Cutter Jam Sensor
1	23	Input	Inserter Sta. 1 Sns

Rack	Opto	Type	
2	00		Not Used
2	01		Not Used
2	02		Not Used
2	03		Not Used
2	04		Not Used
2	05		Not Used
2	06		Not Used
2	07		Not Used
2	08		Not Used
2	09		Not Used
2	10		Not Used
2	11		Not Used
2	12		Not Used
2	13	Output	First Hold Kicker
2	14	Output	First Hold Brake
2	15	Output	First Hold Clutch
2	16	Input	Ins Ink Mark Pres
2	17		Not Used
2	18		Not Used
2	19		Not Used
2	20		Not Used
2	21		Not Used
2	22		Not Used
2	23		Not Used

Before powering up the 438, the operator must remove any packages in the accumulator to be sure there will be no initial error conditions.

C.2 GENERAL SOLUTIONS TO ERRORS

Many error codes are the result of jammed paper (physical errors), or paper expected at specific time and location (read errors: sequence, blank page, misprinted code, etc.).

The sensors index the number of sheets as they pass, incrementing a count on the CPU-486. If a corresponding decrement of count does not occur from the next sensor, a read error is generated. If error persists, consider failure of sensor or communication problem (poor connection, etc.).

For many read errors, check that setup parameters are correct before pursuing functional troubleshooting.

Read errors require a determination of the integrity of the pack. The operator must look at the readings on the display and manually verify each sheet.

When read errors occur, it indicates that the integrity of the package is in question. The 438 was not able to verify a page while stream feeding a package. When the operator is satisfied that the package is complete, press the DUMP key to release the package.

Once a reading error (BLANK or MISREAD) is declared, additional feeding via the CYCLE key will continue to display BLANK or MISREAD errors, but will not stop the machine.

Solutions to Less Common Errors

A rare, but more difficult-to-find problem can occur with shorts in the 24VDC circuit. Intermittent failure of sensors (5VDC supply) can result from the 24VDC short. The short will only occur when a 24V component activates, dropping the 5V supply across the line. The 24V solenoid may be located some distance from the sensor which is the apparent problem: consider what is supposed to happen before or as the sensor is supposed to read.

If either the Feeder speed or Folder speed are approximately half of the other, an encoder channel is probably lost. (Check speeds through Test menu on display.)

Any time a new CPU-486 board is installed, the presets must be reset, or there will be an error displayed.

If PWB errors occur (errors with PWB as probable source), pull the board and make sure that all board components are properly seated. Re-install the board and make sure it is properly seated.

If reader problems are recurring, re-calibrate with the calibration sheet. Feed the sheet through several times to ensure that the reader encoder is returning good data. If data is inconsistent, replace the reader encoder.

An "invalid calibration" error indicates that the calibration reading was more than 15% different from the expected (stored) result. See above.

C.3 ERROR CODES

Error   A unique error number. The first two digits specify a machine area or module. The last three define the specific
                 error.
EVENT   The event or process being monitored.
EVENT CHECK   The mechanism or 'thing' used to monitor the event.
ERROR ON   The reason an error is flagged.
CHECK VALUE   The value being used to flag the error. Some are calculated based on speed, sheet length etc.
ADJUST VALUE Where the check value can be adjusted.

ERROR CODE SECTIONS
- 11xxx // System Messages
- 12xxx // Feeder Messages
- 13xxx // Accumulator Messages
- 14xxx // Folder Messages
- 15xxx // Xfer Conveyor Messages
- 16xxx // Barreader Messages
- 17xxx // Inserter Messages
- 18xxx // Linereader Messages
- 19xxx // EngValue Messages
- 20xxx // COMMPORT3 Messages
- 21xxx // InFeed Messages

C.3a (11xxx) System

Error   Description

11820 "Exit Demand Timeout"
      EVENT: Accum. Package Ready to Exit Demand.
      EVENT CHECK: ExitDemandTimer.
      CHECK VALUE: 60 sec.
      ADJUST VALUE: Engin. Value 21
      ANALYSIS: Time exceeded.

11821 "Cover Interlock Open or Emergency Stop Set"
      EVENT: Interlock ON.
      EVENT CHECK: Interlock.
      CHECK VALUE: --
      ADJUST VALUE: --
      ANALYSIS: Interlock ON at power ON.

11822 "Cover Interlock Open or Emergency Stop Set"
      EVENT: Interlock ON.
      EVENT CHECK: Interlock.
      CHECK VALUE: --
      ADJUST VALUE: --
      ANALYSIS: Interlock ON at machine powered.

11824 "Exit Sensor Error"
      EVENT: Exit Demand.
      EVENT CHECK: Exit Demand and Exit Sense, Inserter Station 1 Sense.
      CHECK VALUE: --
      ADJUST VALUE: --
      ANALYSIS: Inserter Station 1 Sense covered for 6 demands. Sensor blocked

C.3b (12xxx) Feeder

<u>Error</u>   <u>Description</u>

12001 "No Feed Error"
EVENT: Feed Clutch ON, page lead edge to Feed Sensor
EVENT CHECK: NoFeedTimer.
CHECK VALUE: 500 msec.
ADJUST VALUE: --
ANALYSIS: Time exceeded.

12820 "DOUBLE PAGE FED"
EVENT: Under Feed Sensor, Double Detect Sensor.
EVENT CHECK: DoubleDetectCount.
CHECK VALUE: > 2
ADJUST VALUE: --
ANALYSIS: DoubleDetectCount exceeds 2.

12821 "MISSED PAGE"
EVENT: Page lead edge to Feed Sensor, next page lead edge to Feed Sensor.
EVENT CHECK: Page lead edge to Feed Sensor.
CHECK VALUE: --
ADJUST VALUE: --
ANALYSIS:
- No page trail edge. Trail of previous page not sensed.
- This error can be caused by electronic noise generated by the 438 or a connected machine

INITIAL ACTION:
- Ground the 438 and the connected machine (i.e. inserter) together
- Plug the Open Feed Sensor into the Transfer Conveyor Exit Sensor Plug (if using this option)
- If 438 is not in a read mode, go to Setup>> Feeder>>Pulse Feed and make sure "None" is not selected.
- Obtain GBR Technical Bulletin 271-27819-400 for further grounding instructions.

12822 "LONG PAGE FED"
EVENT: Feed Clutch ON, page lead edge and trail edge through Feed Sensor.
EVENT CHECK: JamTimer
CHECK VALUE: 150 msec. [(Sheet Length * 150) / Speed]
ADJUST VALUE: --
ANALYSIS: Time exceeded.

12823 "EXTRA PAGE WAS FED"
EVENT: Page lead edge at Feed Sensor.
EVENT CHECK: Feed Sensor.
CHECK VALUE: --
ADJUST VALUE: --
ANALYSIS: Page lead edge at Feed Sensor. Feed not processing.

12825 "FEED TO ACCUMULATOR JAM(TIME)"
EVENT: Feed Clutch ON, page lead edge and lead edge through Accum. Sensor.
EVENT CHECK: FeedToAccumTimer.
CHECK VALUE: 170 msec. [(CHECK VALUE * 160) / Speed]
ADJUST VALUE: Engin. Value 24
ANALYSIS: Time exceeded.

12826 "SPEED LOW"
EVENT: Feed Encoder Sensor.
EVENT CHECK: Calculate and Average speed.
CHECK VALUE: 25 inches per second
ADJUST VALUE: --
ANALYSIS: Speed less than value.

12827 "FEED SENSOR COVERED"
        EVENT: Feed Sensor ON.
        EVENT CHECK: Check at Feeder Power On.
        CHECK VALUE: --
        ADJUST VALUE: --
        ANALYSIS: Feed Sensor ON.

C.3c (13xxx) Accumulator

Error   Description
13000 "Stack Error"
        EVENT: Page passing through Acc. Stack Sensor.
        EVENT CHECK: StackTimer.
        CHECK VALUE: 500 msec.
        ADJUST VALUE: --
        ANALYSIS: Time exceeded.

13001 "Misfeed Error"
        EVENT: Acc. Clutch ON, page passing out of Acc. Presence Sensor.
        EVENT CHECK: NoDumpTimer.
        CHECK VALUE: 150 msec. [(Sheet Length * 150) / Speed]
        ADJUST VALUE: --
        ANALYSIS: Time exceeded.

C.3d (14xxx) Folder

Error   Description
14001 "Jam In Folder"
        EVENT: Accum. Clutch ON to lead edge Folder Exit Sensor.
        EVENT CHECK: FolderExitTimer.
        CHECK VALUE: 400 msec.

ADJUST VALUE: Engin. Value 4
ANALYSIS: Time exceeded.

14002 "Jam At Folder Exit"
EVENT: Accum. Clutch ON, increment. Lead edge at Folder Exit Sensor, decrement.
EVENT CHECK: PackageCounter.
ERROR ON: > 2.
CHECK VALUE: 2.
ADJUST VALUE: Engin. Value 4

14820 "SPEED LOW"
EVENT: Folder Encoder Sensor.
EVENT CHECK: Calculate and Average speed.
CHECK VALUE: 25 inches per second
ADJUST VALUE: --
ANALYSIS: Speed less than value.

C.3e (15xxx) Xfer Conveyor(Xfer Cvyr, Xcvy)

Error   Description
15001 "Jam Error"
EVENT: Pack at Xcvy Sta. 1/In Sensor, increment. Pack at Xcvy Out Sensor, decrement.
EVENT CHECK: PackageCounter.
ERROR ON: > 5.
CHECK VALUE: 5.
ADJUST VALUE: Engin. Value 18

15002 "Jam At In Sensor Error"
EVENT: INSERTER. Xcvy. Clutch ON to Pack out of Xcvy Sta. 1/In Sensor.
EVENT CHECK: JamAtInTimer.
CHECK VALUE: 500 msec.
ADJUST VALUE: Engin. Value 23
ANALYSIS: Time exceeded.

15003 **"Jam At Out Sensor Error"**
   EVENT: INSERTER. Xcvy. Clutch ON to Pack into Xcvy Out Sensor.
   EVENT CHECK: JamAtOutTimer.
   CHECK VALUE: 3000 msec.
   ADJUST VALUE: Engin. Value 22
   ANALYSIS: Time exceeded.

15002 **"Jam At In Sensor Error"**
   EVENT: HOPPERFILL. Xcvy. Clutch ON to Pack into Xcvy Sta. 1/In Sensor.
   EVENT CHECK: JamAtInTimer.
   CHECK VALUE: 500 msec.
   ADJUST VALUE: Engin. Value 23
   ANALYSIS: Time exceeded.

15003 **"Jam At Out Sensor Error"**
   EVENT: HOPPERFILL. Pack into Xcvy Sta. 1/In Sensor to Pack into Xcvy Out Sensor.
   EVENT CHECK: JamAtOutTimer.
   CHECK VALUE: 3000 msec.
   ADJUST VALUE: Engin. Value 22
   ANALYSIS: Time exceeded.

15820 **"Jam Into Xfer Cnvy Station 1"**
   EVENT: HOPPERFILL. Xcvy. Clutch ON to Pack into Xcvy Sta. 1/In Sensor.
   EVENT CHECK: IntoStation1Timer.
   CHECK VALUE: 225 msec. [(CHECK VALUE * 100) / Speed]
   ADJUST VALUE: Engin. Value 8
   ANALYSIS: Time exceeded.

15821 "Jam Out Of Xfer Cnvy Station 1"
     EVENT: HOPPERFILL. Xcvy. Clutch ON to Pack out of Xcvy Sta. 1/In Sensor.
     EVENT CHECK: OutOfStation1Timer.
     CHECK VALUE: 60 msec. [(CHECK VALUE * 100) / Speed]
     ADJUST VALUE: Engin. Value 9
     ANALYSIS: Time exceeded.

C.3f (16xxx or 18xxx) Reader

(nn=16 Bar Read Messages or nn=18 Line Read Messages)

Error	Description	Cause/Remedy
nn001	**"GROUP NUMBER OUT OF SEQUENCE"**	The page that was just fed did not follow the selected group sequencing pattern. -If the group is not out of sequence, check to see that the proper barcode is printed on the page and that the barcode matches the specifications. -Check to see that the proper barcode job is selected.
nn002	**"EXPECTED END OF GROUP"**	If page sequencing down and the last page fed was page 1, the software expects the next page to have an end of set mark on it (new set and highest page of that set) or if 6 pages are fed into the accumulator, the software expects the next page to have a subset mark or an end of group mark on it. -If an end of group mark was present, check to see that the proper barcode is printed on the page and that the barcode matches the specifications. -Check to see that the proper barcode job is selected.
nn003	**"BLANK PAGE"**	No code detected. -Check read setup again, particularly focus. -Check for correct feed speed. -Check speed sensor for proper operation. -Check for failure on the CPU, replace as necessary. -Bad UARTs. -Bad software.

nn004 "SHORT GROUP"

```
- Check the page to determine if error is valid
-Check read setup again, particularly focus.
-Check for correct feed speed.
-Check speed sensor for proper operation.
-Check for failure on the CPU, replace as necessary.
-Bad UARTs.
-Bad software.
```

nn005 "DUPLICATE PAGE"

```
-Check read setup again, particularly focus.
-Check for correct feed speed.
-Check speed sensor for proper operation.
-Check for failure on the CPU, replace as necessary.
-Bad UARTs.
-Bad software.
```

nn006 "PAGE OUT OF SEQUENCE"

```
The page that was just fed did not follow the selected page
sequencing pattern.
-If the page is not out of sequence, check to see that the proper
barcode is printed on the page and that the barcode matches the
specifications.
-Check to see that the proper barcode job is selected.
```

nn007 "INVALID GROUP"

```
Group is not part of set.
-Check to see that the proper barcode is printed on the page and that
the barcode matches the specifications.
-Check to see that the proper barcode job is selected.
-Check read setup again, particularly focus.
-Check for correct feed speed.
-Check speed sensor for proper operation.
-Check for failure on the CPU, replace as necessary.
-Bad UARTs.
-Bad software.
```

nn008 "EXPECTED PAGE ONE"

```
If page sequencing up, the software expects the first page of each
set  to be either a 0 or 1 (depending on what minimum page number was
selected in the page setup).
-If the page was page 1, check to see that the proper barcode is
printed on the page and that the barcode matches the specifications.
-Check to see that the proper barcode job is selected.
```

nn009 "GROUP NUMBER OUT OF RANGE"

```
Group code was not in specified range (i.e. 0-7)
```

nn010 "PAGE OUT OF RANGE"   Similar to Group Out of Range error (page range must be within 1-7)

nn011 "INVALID!"   Invalid command
                                               -Cycle machine power

nn012 "NOT ENOUGH NV-RAM"   The program has run out of non-volatile ram.
                                               - You should never get this error. If you do get this error, either
                                               the software is bad or the cpu board is bad.

nn013 "PRESETS CORRUPT"   Some of the preset parameters have fallen out of their defined
                                               maximum or minimum range.
                                               -If new EPROMS were just installed this error might occur. If this
                                               is the case, ignore the error.
                                               -If the battery jumper was pulled from the cpu board this error might
                                               occur. If this is the case, install the battery jumper and ignore
                                               the error.
                                               -If neither of the previous scenarios happened, the cpu board is
                                               probably bad.

nn014 "NV RAM FAILED"   Data in the non-volatile ram was changed.
                                               -Power to the CPU was unplugged directly at the board.
                                               -Noise in the 120 VAC power.

nn015 "DUAL PORT RAM FAILED"   Hardware failure on reader board
                                               -Battery failed or battery jumper missing
                                               -Bad CPU-186 board

nn016 "INVALID COMMAND"   Hardware failure on reader board
                                               -Battery failed or battery jumper missing
                                               -Bad CPU-186 board

nn017 "INVALID PIC INT."   Hardware failure on reader board
                                               -Battery failed or battery jumper missing
                                               -Bad CPU-186 board

nn018 "INVALID SETUP DATA"   Reader board memory corrupted
                                               -Restart machine

nn019 "PARITY ERROR"   Actual lines of codes must match parity setting (odd or even).
                                               -Bad code

nn020 "computed in action" REGISTRATION BAD OMR Linecode marks are out of tolerance or the spacing is inconsistent
                                              -Bad code

nn021 "BAD ON-CHIP 8501 RAM"   Hardware failure on reader board
                                              -Battery failed or battery jumper missing
                                              -Bad CPU-186 board

nn022 "INVALID READER ERROR"   CPU does not understand reader

nn023 "INVALID CAL. SETUP"   Feed through calibration sheet several times to ensure that encoder is
                                              reading properly (consistent read numbers)
                                              -Reader encoder bad

nn024 "NO BANK 2 GATE MARK"   Reader was expecting two sets of read code, one was missing
                                              -Reader set up improperly
                                              -Code is physically missing
                                              -Check to see that the proper barcode job is selected.

nn025 "computed in action "CALIB_OUT_OF_RANGE" Calibration failed
                                              -Check calibration sheet
                                              -Check read setup again, particularly focus.
                                              -Check for correct feed speed.
                                              -Check speed sensor for proper operation.

nn026 "YES NO EOG ARE SAME"   This error is only associated with European machines
                                              -Check read setup again, particularly focus.
                                              -Check for correct feed speed.
                                              -Check speed sensor for proper operation.
                                              -Check for failure on the CPU, replace as necessary.
                                              -Bad UARTs.
                                              -Bad software.

nn027 "ROLL PAGE OUT OF SEQUENCE"   The page that was just fed did not follow the selected roll
                                              sequencing pattern.
                                              -If the roll is not out of sequence, check to see that the proper
                                              barcode is printed on the page and that the barcode matches the
                                              specifications.
                                              -Check to see that the proper barcode job is selected.

nn028 "UNEXPECTED RESPONSE"   -Paper jam
                                              -Reader board failed

-Reader encoder bad

nn029 "EXPECTED READING"   -Blank page
                                                 -Read encoder failed
                                                 -Paper jam
                                                 -Feed sensor out of adjustment

nn030 "READER REBOOTED"   -Reader encoder failed
                                                 -Bad read board

nn031 "computed in action" "CALIB. IN RANGE" Calibration was successful

nn032 "NO RANDOM CHECK MK."   -Incorrect document in accumulator
                                                 -Random check mark not set correctly in Setup
                                                 -Code bad or misprinted

nn033 "UNEXPECTED RANDOM CHECK"   -Incorrect document in accumulator
                                                 -Random check mark not set correctly in Setup
                                                 -Code bad or misprinted

nn034 "PACK LARGER THAN SET"   There were more sheets in the package than expected.

nn035 "PACK LESS THAN SET"   There were less sheets in the package than expected.

nn036 "GROUP NUMBER CHANGED IN SET"   Every page within a set is supposed to have the same group number and
                                                 the page that was just fed did not.
                                                 -If the group did not change within the set, check to see that the
                                                 proper barcode is printed on the page and that the barcode matches
                                                 the specifications
                                                 -Check to see that the proper barcode job is selected.

nn037 "LAST SET SAME GROUP NUMBER"   The previous group had the same group # as the current.

nn038 "MAX SHEETS IN ACCUM."   The maximum number of sheets set in the system has been reached
                                                 -Change setting if a larger pack size is desired
                                                 -The package size has exceeded the machines capabilities

nn039 "UNEXPECTED EOG"   The end of group mark was read but not expected.
                                                 -The document sequence is out of order.
                                                 -Misread.
                                                 -Bar code misprinted.

nn040 "NO RESPONSE TIMEOUT"

The reader did not return a reading in the proper amount of time.
-Make sure that the barcode reader is lined up with the code.
-Make sure that the barcode print on the paper is good quality.

nn041 "BAD READ" (bar read)

The bar code reader returned an error.
-Make sure that the barcode reader is lined up with the code.
-Make sure that the barcode print on the paper is good quality.

nn042 "MAX PAGE NOT = NO. PAGES" (bar read)

Incorrect page count in accumulator
-Page count setting incorrect
-EOG mark not seen
-Read error

nn043 "INVALID GROUP NUMBER" (bar read)

-Incorrectly printed document
-Documents out of order
-Code not seen
-Check, clean and adjust scanner

nn044 "BAD CHECK DIGIT" (bar read)

Check digit in code is wrong
-Code not seen
-Check, clean and adjust scanner

nn045 "EXPECTED END OF SET" (bar read)

Documents in package exceeded the max sheets expected

nn046 "EXPECTED PAGE ZERO" (bar read)

Page out of sequence
-Incorrectly printed document
-Documents out of order
-Code not seen
-Check, clean and adjust scanner

C.3g (17xxx) Inserter Messages

Error   Description

C.3h (19xxx) EngValue Messages

Error   Description

C.3i (20xxx) COMMPORT3 Messages

Error   Description

C.3j (21xxx) InFeed

Error   Description

21801 "Paper Demand Timeout"
>   EVENT: Paper Demand Switch ON to Paper Demand Switch OFF.
>   EVENT CHECK: PaperDemandTimer.
>   CHECK VALUE: 20000 msec.
>   ADJUST VALUE: Engin. Value 17
>   **ANALYSIS:** Time exceeded.

SECTION D – REPAIR INFORMATION

D.1 INITIAL ACTIONS

Initial Actions are used to gather information from the operator concerning problems in 438.

D.1a Procedure

Ask the operator to describe or demonstrate the problem. Request all information on the failure. If there is an error message, refer to the index for guidance to appropriate RCP. Some features of the machine may not be tested during the system checks and therefore, operator input will be a valuable asset to help diagnose the total system.

If the problem is the result of improper operator action, refer the operator to the operator documentation or instruct the operator on the proper actions.

Switch the 438 AC power OFF.

Check all areas of the machine for paper or other obstructions (including inside the Folder). Remove any paper or obstructions. Feed a sheet through the machine to confirm that alignment adjustments are correct.

Turn ON the 438, press RESET/ON, and confirm the following:

- All drive belts are moving
- Sensors are not blocked or fouled
- Machine operating parameters set correctly
- Document inserted in paper hopper passes through and is properly folded

NOTE: If physical paper jams recur and mechanical adjustments are correct, escalate service. Potential trouble spots are numerous but include: worn or damaged parts; stretched drive belts; excess static.

Verify all cable connections are properly mated, and all applicable sensor connections (as per application) are mated properly and not obstructed. In SETUP, verify that correct input parameters are selected.

Verify the Emergency Stop button is not actuated.

D.1b List of Repair Checkout Procedures (RCP)

D.1c   Systems Checks

Switch the 438 power ON. The Feeder motor starts.

Y   N

> Close all covers
> Perform the **Feeder Speed is Too Slow RCP**

Press the CYCLE key on the Operator Control Panel momentarily.
A document is fed through the singulating area to the 438.

Y   N

> Perform the **Paper Could Not Be Fed RCP**

Press the CYCLE key on the Operator Control Panel for about 1 second.
A continuous stream of documents is fed to the 438.

Y   N

> Perform the **Paper Jam in Feeder RCP**

With the 438 in CYCLE mode the creeper conveyor supplies documents when needed.

Y   N

> Perform the **Creeper Conveyor Motor RCP**
> Adjust the Paper Level Detector

D.2 FEEDER FUNCTION

D.2a Description

A paper hopper supplies the bottom fed friction feeder continuously while the operator loads paper from the top. It has 4 mounts (2 each side, with set screws) in which the hopper slides. The creeper conveyor comprises two black rubber belts driven by a motor located on the bottom side of the hopper. Controlled by a paper level detector, the motor is activated when the detector activates the paper demand switch.

The two stainless steel rails mounted on the hopper are adjustable via a locking handle at the rear. At the front they interlock with the singulator rails, then lock to shafts running across the machine. Both sets of rails should be adjusted together.

A one inch wide yellow timing belt (main feed belt) drives the bottom sheet of paper under the singulator roller. Two red urethane belts are located to either side of the main feed belt. These auxiliary feed belts assist the main feed belt, smoothing variations in frictional drive (correcting erratic feeding of the paper).

A demand switch monitors the paper going into the feeder area. It's job is to limit and demand the amount of paper that is most productive to the feeding process. A metal wand monitors the paper level in the singulator area. A two-inch stationary orange roller rests above the feed belt in the center of the feeder and allows only the bottom sheet of paper to be fed while holding back all others.

A series of sensors monitors the flow of paper through the 438. These are light-actuated through-beam devices. A feed sensor monitors correct singulation or non-feed of paper. It is identified by an "F" on the amplifier. The double detect sensor (identified by an "D" on amplifier) will detect multiple sheets fed from the feeder. Other sensors are located in the accumulator section (described below). On either the left or right feeder side rail is a read sensor, or optical mark reader. This sensor uses a reflective beam to generate an electric signal to a reader logic board. The reader logic board interprets variation in light intensity as it is reflected off the paper and code marks.

Paper feeding is accomplished when the feed motor drives the belts. An electric clutch engages the feed belt at a signal from the controller.

The optical encoder (blue-clad, located on the right side of the upper pullout shaft) monitors feeder run speed.

D.2b Timing Procedures

(Not applicable: timing is a function of software and CPU-486.)

D.2c   Feeder Setup and Adjustments

Paper Guide Rails

These rails guide the paper from the Hopper Table, through the singulator area and to the accumulator area without skewing. The rails are divided into three sections on each side. These are the accumulator, feeder and hopper sections.

The singulator and hopper rails should be set so that with a single sheet of paper between them, there is a 1/16-inch space between the side of the sheet and the guide rail. Make certain that the guide rails run parallel with the side frame of the machine. The singulator rails should be set first. They are mounted on two black metal blocks, which are mounted on cross shafts. To adjust these rails, loosen the set screws locking the singulator rail blocks to the cross shafts. The hopper rails interlock with the singulator rails at one end. They are locked into place at the rear of the machine when the rail locking shaft is in the locked position. The accumulator area side rails do not actually guide the paper from side to side. They should be set so that there is approximately 1/8 inch on either side of the sheet.

NOTE: Be sure the side rails are feeding the paper parallel to the Singulating roller.

Paper Hopper Adjustment

The Guide Rails align the paper from the hopper table into the singulator. This permits the paper to exit the singulator area in proper alignment with the transfer conveyor, without skew. The position of the hopper table relative to the feeder is a very critical adjustment. To adjust the hopper table:

a)   Place a sheet of paper in the feed area, up to but not under the singulator.

b)   Loosen the four set screws of the hopper guide rails. Once this is accomplished the table will move freely in and out. Do not pull the table all the way out of the clamps: it will fall!

c)   Bring the hopper table 1/2" away from the back edge of the sheet of paper.

d)   Tighten four set screws down to clamp the table into this position.

Whenever document length is changed this process must be performed to ensure the proper transfer of paper from the hopper table to the feeder area.

Paper Level Detector

The demand switch monitors the paper through a metal wand. On the top of the wand is a spring-loaded, hex head adjustment bolt which, when turned, raises and lowers the wand.

- Raise the wand to allow more paper to be fed into the feeder
- Lower the wand to reduce the amount of paper.
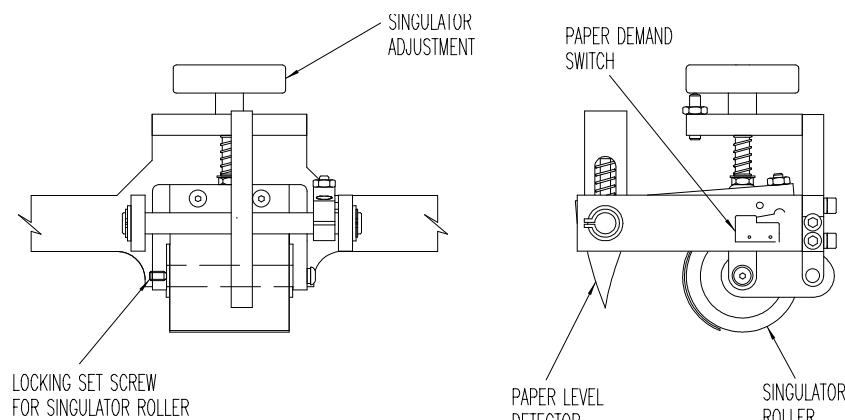
Singulator and Paper Demand Figure

Setting Main Feed Belt Tension

The Feed Belt provides the primary force separating a sheet from the bottom of the shingled stack. The setup procedure for this belt is described below. The Feed Belt tension adjustment knob is factory set, limited to approximately 3/4 turn. This is adequate operator adjustment for typical paper weight variations. If the Feed Belt is replaced:

1. Loosen the long set screw (3/32") on the top stop collar of the Feed Belt tension knob shaft.
2. Lay a straight edge across the top of the Feed belt (lengthwise). Make sure it lays across both pulleys.
3. Adjust the Feed Belt tension knob so 3/16 inch Feed Belt deflection is possible in the middle of the belt.
4. Now turn the Tension Knob 3/8 turn CCW.
5. Slide the stop collar to the top of the Tension Knob shaft. Position collar so the long set screw is perpendicular to the side frame. Tighten set screw to the Tension Knob shaft. This will again limit adjustment to 3/4 turn.
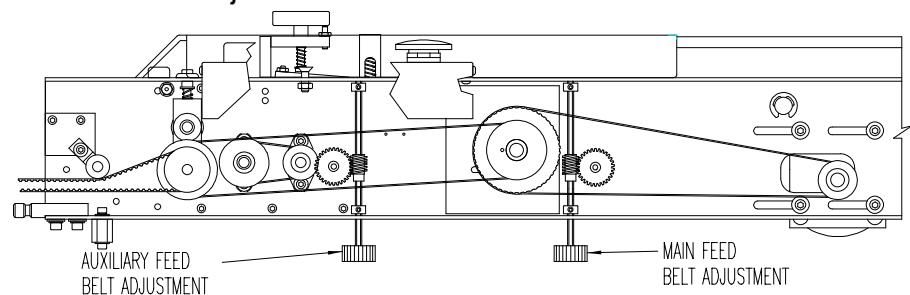
Belt Adjust Figure

Singulating Roller

The Singulating Roller creates a precise singulating gap. There are three critical adjustments required to get a precise singulating gap. These adjustments are:
• Vertical Position of Singulating Roller
• Singulating Roller parallel with lower rollers
• Occasional rotation of Singulating Roller

Position of Singulating Roller

The position of the Singulating Roller with respect to the two rollers on the lower shaft is critical. This spacing creates the singulating gateway. The setup process is as follows:

1.   Place one sheet of paper under the singulator.
2.   Lower the Singulating Roller so one sheet of paper can not pass under the roller. (Use chrome knurled knob.)
3.   Slowly raise the Singulating Roller, using the adjusting knob.
4.   Attempt to pull the document out while slowly raising the Singulating Roller with the chrome knurled knob.
5.   When the document starts to move as you firmly pull it under the Singulating Roller, proper singulation adjustment is achieved.
6.   Load the singulation area with paper and test feed paper.
7   If more than one sheet is fed, lower the Singulator two knob clicks. If after adjusting as many as five knob clicks proper feeding is not obtained, then all of the setup procedures for the singulator should be reviewed.

NOTE: Proper singulator adjustment depends on paper variables such as stock, finish and environmental factors. Specific adjustment on every job will be different. Adjust the singulator roller as paper runs to get best setting.

Set Singulating Roller Parallel to Lower Rollers

The precise gap created by the Singulating Roller and the two lower rollers must be equivalent for both of the rollers. The procedure for testing and making the adjustment is described below.

Note: This adjustment is normally done only when a new Singulating Roller is installed. It should not be adjusted experimentally; i.e., without need.

1. Cut two strips of paper from the same document (approximately 1/2" x 8").
2. Put them between the two lower rollers and the large Singulating Roller.
3. Adjust Singulating Roller until light tension is felt on the paper between the rollers.
4. Check that the tension on both strips of paper is the same. If it is not the same, then adjust the geometry of the Singulating Roller.
5. Loosen the 10-32 x 5/8 socket head cap screws (4) on the side rail or the back of the singulator plate. Adjust either to best advantage.
6. Carefully position the singulator, using the small amount of play available, to raise the side of the singulator that has the most tension.
7. Tighten the 10-32 x 5/8 socket head cap screws loosened in step 5.
8. Retest the tension of the two strips of paper by returning to step 3.

Rotating Singulating Roller

The Singulating Roller is the place where the highest frictional forces are created. These frictional forces wear down the Singulating Roller. This requires that the Singulating Roller be rotated approximately every 250,000 sheets fed, depending on paper type and operator's adjustment of the singulator.

1. Raise Singulating Roller off the auxiliary Singulating Rollers and belt.
2. On left hand side of the Singulating Roller use a 5/64" Allen wrench to loosen the set screw which keeps the Singulating Roller from rotating.
3. Rotate the Singulating Roller to expose a new wear surface (rotate about 1/4 inch). The worn surface should be rotated forward. This will prevent the worn surface from coming in contact with paper that is being fed into the singulation point.

Auxiliary Feed Belt Adjustment

The auxiliary feed belts are adjustable by angling the back end up or down.

- Turn the knob clockwise to lower the rear end of the auxiliary drive belts
- Turn the knob counterclockwise to raise the rear end of the belts.
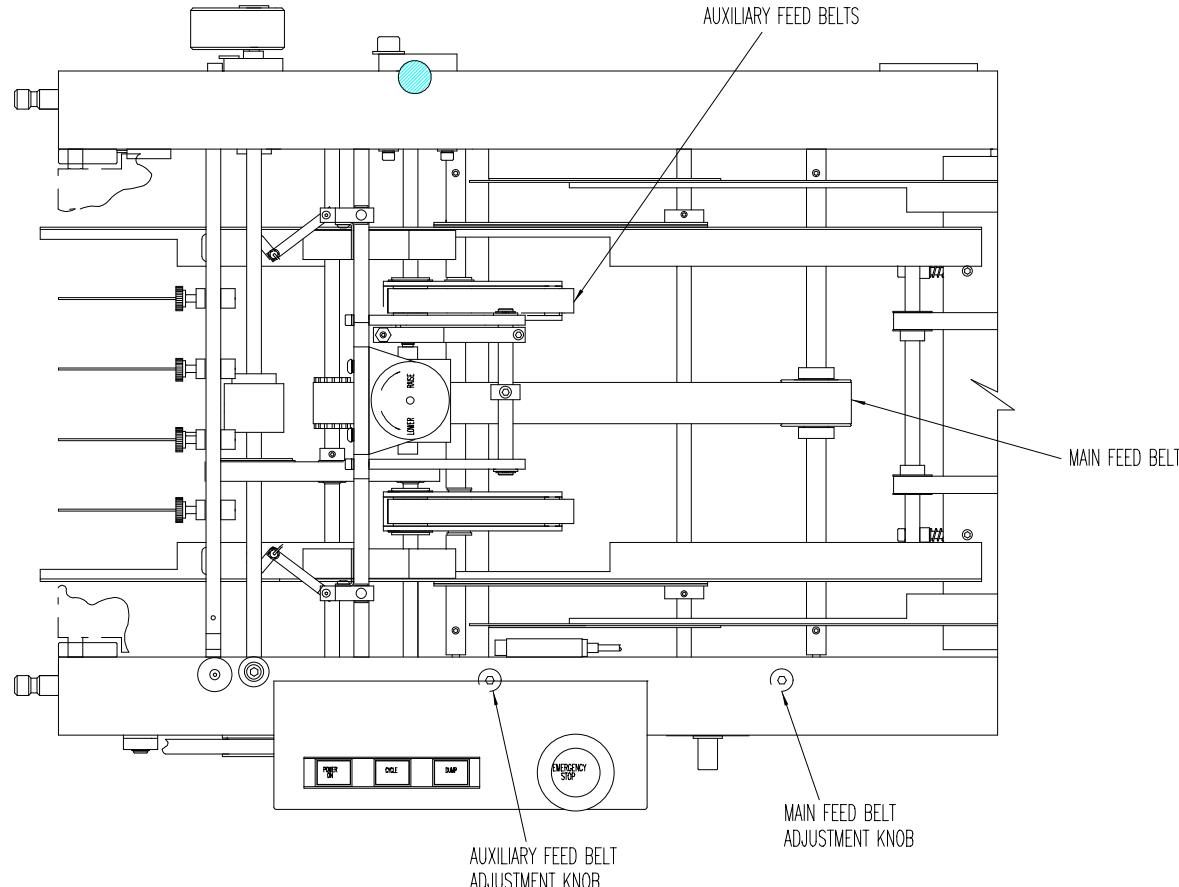
The ideal setting for the auxiliary belts is when the back end is raised just above the main feed belt.

The auxiliary feed belts assist the main feed belt when variations in frictional quality are encountered and the feeding of paper becomes erratic. The auxiliary feed belts would be adjusted when the gap between the fed sheets needs to be altered. Raising the auxiliary feed belts will decrease the gap; lowering the belts will increase the gap.

Feed Belts Figure

Sensor Adjustments

All of the paper detecting sensors on the 438 are infrared modulated digital sensors. Each sensor has it's own amplifier unit and can be adjusted. The proper method of adjustment for these sensors is as follows:

1.   Place a single sheet of paper under the sensor. For the Double Detect Sensor place two sheets under the sensor. There should be no printing or dark background present on the documents placed under the sensor.

2.   Adjust the gain potentiometer on the sensor's amplifier unit so the red LED turns off and the green LED remains on. Turning the control CCW the sensitivity is lowered and the red light will go out. Adjusting the control CW raises the sensitivity and makes the red light get brighter. (For the Double Detect Sensor, the red LED should go off only if two sheets are present.)

3.   Remove the sheet(s) from under the sensor; the red LED should turn on and the green LED stay on. If this does not happen, readjust the amplifier's gain.

NOTE: The green LED, on the sensor amplifier, is the stability indicating light. It indicates that the sensor is adjusted properly. The green LED should remain on at all times.
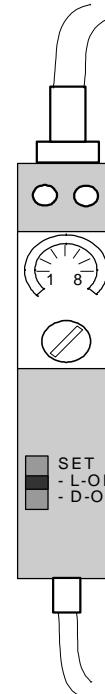
Sensor Figure

D.3   REPAIR CHECKOUT PROCEDURES (RCP)

REPAIR CHECKOUT PROCEDURE FOR PAPER COULD NOT BE FED

Clear the paper that was jammed in the machine and remove any obstructions. Are mechanical settings correctly made?
Y   N

- Check the wiring and connections for intermittent connections.
- Adjust the singulator roller.
- Adjust the auxiliary feed belts.
- Check the paper guides; ensure that the paper passes under the sensor.
- Ensure that the drive pulleys are tight.
- Check the feed clutch

Are the lights on the Feed Sensor illuminated?
Y   N - Place one sheet of the current stock in the sensor area and adjust the sensor so that the red LED goes out with the sheet blocking the sensor. Check that printing on the stock is not interfering with the sensor. Does the LED on opto 1 light when one sheet is under the sensor?

        Y   N

        Check the small fuse for opto relay #1
        Check the optical relay

Is there 24 VDC at TB2-1 and TB2-2?
Y   N

- Check the connection from the controller to the Feeder
- Check the wiring
- Check the power supply

Clean the sensors. Do the LEDs come on?
Y   N - Enter diagnostic Routines. Select display status of Feed Sensor input 0:0. Does digital input change ON with the sensor blocked by one sheet of paper?
        Replace the sensor.

Check wiring between the Control Box and keyboard. Are there breaks or poor connections?
Y   N - Replace the CPU
Correct the wiring.

REPAIR CHECKOUT PROCEDURE FOR FEEDER MOTOR

When the 438 is powered, creeper power is supplied to the Feeder via AC outlet J2 of the power supply box. The AC goes through Paper Level Detect switch (also called demand switch: SW15) to SSR4. Does the Creeper Motor go on when the level switch is closed?

Y   **N**

- Make sure that SW15 is closed and that no emergency switch is open.
- Check fuses F1 and F2.
- Check wiring between the LF4 and creeper motor.

The power is applied to the AC outlet, then to SSR4, when rack 1, opto 2 LED is lit in the 438. Is there voltage at the connector that feeds the motor when the RESET/ON key is pressed?

Y   **N -** Check fuse F2. Is it good?

- Replace the fuse

Enter Test function. Select Speed from the menu. Activate the Feeder motor: does the motor run and LED of opto 2 on opto rack 1 light?

Y   **N**

- Check relay SSR1.
- Make sure the speed pot is properly set.

Check for 120VAC across the line side of LF4. Check for 90VDC across the + and - terminals of the creeper motor. Are these voltages present?

Y   **N**

- Replace LF4.
- Replace the creeper motor.

Paper is fed through the Feeder as the Feed Clutch fires.

Y   **N**

- Replace the Feed Clutch.

REPAIR CHECKOUT PROCEDURE FOR FEEDER SPEED ENCODER

Enter the TEST menu from the VIP display. Select INPUT from the submenu and select Feeder Speed Encoder input. Turn the machine by hand and listen for a beep, indicating encoder state is changing.

Y   N

- Check input opto 0:2 (opto module 2 on opto rack 0). Does LED light when encoder operates?

Y   N

- Replace the input opto module and repeat the test. Does the LED illuminate?
- Check the wiring between the feeder speed encoder and the opto rack.
- Check the pico fuse of the opto module. Replace if required; does this correct problem?

Y   N

- Check the encoder.
- Replace encoder.

Y   N

- Check a different input to ensure the audible signal on the display is working.
- Fix or replace display board.

Y   N

- Check connections between opto rack and CPU-486. If bad, does correction fix problem?
- Troubleshoot or replace the CPU 486 PWB.

REPAIR CHECKOUT PROCEDURE FOR EXTRA PAGE FED

Clear any paper that was jammed in the machine and remove any obstructions.
Are mechanical settings correctly made?
Y   N

- Check the wiring and connections for intermittent connections.
- Adjust the singulator roller.
- Adjust the auxiliary feed belts.
- Adjust the Paper Level Detector.
- Adjust the Creeping Conveyor.
- Check that the paper guides ensure that the paper passes under the sensor.
- Check that the 438 is set up to run the length of stock that is being used.

Are the lights on the Feed Sensor illuminated?
Y   N - Go to step 4.

Place one sheet of the current stock under the feed sensor and adjust the sensor so that the red LED goes out with the sheet blocking the sensor. Check that printing on the stock is not interfering with the sensor. Does the LED on opto 0:2 light when the sheet is under the sensor?
Y   N

- Check the small fuse for opto relay 2
- Check the optical relay
- Check wiring from the Control Box to the Display.
- Check the wiring and connections for intermittent connections.

Is there 24 VDC between TB2-1 and TB2-2?
Y   N

- Check the connection from the controller to the Feeder
- Check the wiring
- Check 24 VDC power supply

Clean the sensors. Do the LEDs come on?
Y   N

- Replace the sensor.

REPAIR CHECKOUT PROCEDURE FOR PAPER JAM IN FEEDER

Clean the sensors. Do the LEDs come on?

Y   N - Check sensor connections.

- Replace the sensor.

Clear the paper that was jammed in the machine and remove any obstructions. Are mechanical settings correctly made?

Y   N - Check the wiring and connections for intermittent connections.

- Adjust the singulator roller.
- Adjust the auxiliary feed belts.
- Adjust the creeping conveyor.
- Check that the paper guides ensure that the paper passes under the sensor.
- Ensure that the drive pulleys are tight.
- Check the feed clutch
- Check that the 438 is set up to run the length of stock that is being used.

Are the lights on the Feed Sensor amplifier illuminated?

Y   N

- Enter diagnostic Routines. Select Display status of Feed Sensor (opto 0:0). Does display change to ON with the sensor blocked by a sheet of paper?

Y   N - Make sure sensor amplifier is set for Dark ON: correct if necessary.

- Check wiring between the Control Box and keyboard

Place a sheet of the current stock in the sensor area and adjust the sensor so that the red LED goes out with a sheet blocking the sensor. Check that printing on the stock is not interfering with the sensor. Does the audible signal beep and LED on opto o:18 light when a sheet is under the sensor?

Y   N - Check a different input to ensure the audible signal on the display is working.

- Check the small fuse for opto relay #18.
- Check the opto relay.

Is there 24 VDC at TB2-1 and TB2-2?

Y   N - Check the connection from the controller to the Feeder.

- Check the wiring.
- Check the power supply PS1.

REPAIR CHECKOUT PROCEDURE FOR SMALL SHEET

Clear the paper that was jammed in the machine and remove any obstructions. Does the paper move through the feeder properly?

Y   N - Check that the paper size setup is correct.
- Check that the guide rails ensure the paper passes under the Feed and Double Detect sensors
- Ensure that the pullout roller does not force the paper to ride up on the paper guides.
- Check that the paper stock being used is not damaged or curled.
- Adjust the singulator roller.
- Adjust the auxiliary feed belts.

REPAIR CHECKOUT PROCEDURE FOR FEEDER SPEED IS TOO SLOW

Remove the covers from the feeder. Does the feed motor turn on?

Y   N - Is there voltage at the connector that feeds the motor when the RESET/ON key is pressed?

     Y   N

- Check fuse F7.
- Check KBIC Controller board. Replace if necessary.
- Replace the Feeder Drive Motor (REP 8.4)

Enter Diagnostics. Select Display status of Feeder Speed Encoder input (opto 0:3). Change input to ON: does LED #3 on opto rack 0 light?

     Y   N

- Check the optical relay.
- Check optical relay fuse

Enter Diagnostics. Select TEST, "Speed." Option. Does the Feeder speed indicate 50 IPS?

Y   N

- Adjust the speed of the Feeder.
- Replace the speed sensor.
- Replace the KBIC Controller.

REPAIR CHECKOUT PROCEDURE FOR FEED SENSOR

FEED SENSOR - REFER TO SECTION F "FEEDER" SCHEMATIC.

Enter the TEST menu from the VIP display. Select INPUT from the submenu and select Feed Sensor input. Repeatedly block the feed sensor with a single piece of paper. As the sensor is blocked, the audible beep is heard. Does the red LED on opto 0:0 (opto module on opto rack 0) illuminate each time the sensor is blocked, and go out when the sensor is unblocked?

Y **N** - Is the green LED ON?
- Adjust the sensor

Y **N** - Check a different input to ensure the audible signal on the display is working.
- Check the wiring between the feed sensor and the opto rack. If the wiring required correction, does this correct the problem?

    Y **N** - Make sure sensor amplifier is set for Dark ON: correct if necessary.
- Check the pico fuse of the opto module. Replace the input opto module if necessary. Is the problem corrected?

        Y **N** - Replace the CPU 486 PWB.
- Set up and run the machine.

    Run the machine.

Check the singulator setup. Is the feeder providing paper to the singulator?

Y **N** - Did the feed belt pulse three times attempting to feed paper?

    Y **N** - Initiate feed clutch output test. Press ENTER to energize the clutch; listen for click or feel for clutch motion. Does the feed clutch engage?

        Y **N** - Check output opto 1:8 (opto module 8 on opto rack 1). Does LED light when ENTER is pressed? If LED does not illuminate, replace the opto and repeat the test.
- Check for 24VDC at clutch connection. If 24VDC is not present, replace the clutch.

    Check clutch spacing (preset for .005") and clutch surface. If clutch is worn, replace.

REPAIR CHECKOUT PROCEDURE FOR TWO SHEET SENSOR

2 SHEET SENSOR - REFER TO SECTION F "FEEDER" SCHEMATIC.

Enter the TEST menu from the VIP display. Select INPUT from the submenu and select 2 Sheet Sensor input. Repeatedly block the 2 Sheet sensor with your hand or two sheets of paper. As the sensor is blocked, observe opto 0:16 (opto module 16 on opto rack 0). Does the red LED illuminate each time the sensor is blocked, and go out when the sensor is unblocked?

Y   **N** - Check a different input to ensure the audible signal on the display is working.
    Y   **N** - Is the green LED ON?
        Y   **N** - Adjust the sensor
Y   **N** - Make sure sensor amplifier is set for Dark ON: correct if necessary.
    • Check input opto 0:16 (opto module 16 on opto rack 0). Does LED light when sensor activated?
    Y   **N** - Check the wiring between the Double Detect sensor and the opto rack. If the wiring required correction, does this correct the problem?
        Y   **N** - Check the pico fuse of the opto module. Replace the input opto module if necessary and repeat the test. Does the LED illuminate?
            Replace the CPU-486 PWB.
    Run the machine.
Check the singulator; is it properly adjusted?
Y   **N** - Adjust the singulator.

If the components of the machine are operational and correctly adjusted, make sure that the paper being run is of the correct quality and condition.

REPAIR CHECKOUT PROCEDURE FOR READ BOARD ERROR

READ BOARD - REFER TO SECTION F "READER" SCHEMATIC.

NOTE: If read type is changed in SETUP, the 438 must be powered down and back up to clear and reset all read parameters. Also, make sure that the code is centered under the reader light. Code offset from the reader light will give spurious signals.

Refer to the error code as it appears on the 438 display. (If GBR OMR reading is active, perform test as described in section D3.c to help resolve code reading errors.)

"No Response Time-out":
Y   **N** - Perform Read setup: Is setup correct? Power must be cycled ON/OFF after a read type is selected.
      Y   **N** - Check these points on the cabling to determine where signal is being lost.
- Check read probe; replace as required.
- Check pre-amp; replace as required.
- Check read board; replace as required.

Check the wiring to the CPU. Repair the wiring as necessary: does this correct the problem?
Y   **N** - Check the CPU, replace as necessary.

"Code Misread":
      Y   **N** - Is the problem corrected by any of the following tests?
- Check read setup again, particularly focus.
- Check for correct feed speed.
- Check speed sensor for proper operation.

      Y   **N** - Check for failure on the CPU, replace as necessary.
- Bad UARTs.
- Bad software.

Check for paper flutter under read head or pullout roller slipping.
If the waveform is intermittent, check the cable connection: secure or replace as required.

"Expected End of Group":
  Y   N - Check the page to determine if error is valid
         • Check GBR read setup
         • Check these points on the circuit to determine where signal is being lost.
                • Check read probe; replace as required.
                • Check pre-amp; replace as required.
                • Check read board; replace as required.

"Blank Page":
  Y   N - Is the problem corrected by any of the following tests?
         • Check read setup again, particularly focus.
         • Check for correct feed speed.
         • Check speed sensor for proper operation.
  Y   N - Check for failure on the CPU, replace as necessary.
         • Bad UARTs.
         • Bad software.

"Short Group" error:
  Y   N - Check the page to determine if error is valid
              Is the problem corrected by any of the following tests?
         • Check read setup again, particularly focus.
         • Check for correct feed speed.
         • Check speed sensor for proper operation.
  Y   N - Check for failure on the CPU, replace as necessary.
         • Bad UARTs.
         • Bad software.

"Duplicate Page" error:

    Y   N - Is the problem corrected by any of the following tests?
- Check read setup again, particularly focus.
- Check for correct feed speed.
- Check speed sensor for proper operation.

    Y   N - Check for failure on the CPU, replace as necessary.
- Bad UARTs.
- Bad software.

"Page Out of Seq." error:

    Y   N - Is the problem corrected by any of the following tests?
- Check read setup again, particularly focus.
- Check for correct feed speed.
- Check speed sensor for proper operation.

    Y   N - Check for failure on the CPU, replace as necessary.
- Bad UARTs.
- Bad software.

"Invalid Group" error:

    Y   N - Is the problem corrected by any of the following tests?
- Check read setup again, particularly focus.
- Check for correct feed speed.
- Check speed sensor for proper operation.

    Y   N - Check for failure on the CPU, replace as necessary.
- Bad UARTs.
- Bad software.

"Expected Page One" error:

      Y   **N -** Is the problem corrected by any of the following tests?
- Check read setup again, particularly focus.
- Check for correct feed speed.
- Check speed sensor for proper operation.

      Y   **N** - Check for failure on the CPU, replace as necessary.
- Bad UARTs.
- Bad software.

"Group Out of Range" error:

      Y   **N** - Is the group code in the range 0-7?
- Check that code is OK.

"Page Out of Range" error: similar to Group Out of Range error (page range must be within 1-7)

"Presets Corrupt" error: a CPU-486 error that would likely occur on power up

"Yes No EOG Are Same" error: (this error is only associated with European machines)

      Y   **N** - Is the problem corrected by any of the following tests?
- Check read setup again, particularly focus.
- Check for correct feed speed.
- Check speed sensor for proper operation.

      Y   **N** - Check for failure on the CPU, replace as necessary.
- Bad UARTs.
- Bad software.

D.4 ACCUMULATOR SECTION

D.4a Description

Fed by the Feeder Section, the accumulator is used to group up to seven documents before it sends them to the folder. Plastic-wedge stacking ramps position pages sequentially. Stacking rollers are used to stop the paper and hold it in position. When released, the stacking rollers drive the collected pages out of the accumulator.

TheDump Clutch activates the stacking rollers, releasing the accumulated pages. A Stack Sensor ("S") detects paper arriving in the accumulator while the Accumulator Sensor ("A") indicates presence or absence of a package in the accumulator. It also monitors for successful package discharge when the dump clutch has been engaged.

D.4b Accumulator Clutch and Brake Adjustments

The Accumulator Clutch is designed with a preset gap, no adjustments are possible or necessary. There should be a slight amount of rotational freeplay in the clutch body to prevent binding.

The Accumulator Brake does require a gap setting of .005". This setting is critical, too tight and the drag on the clutch will cause premature wearing of the clutch and the brake. Too wide of a gap and the Stacking Rollers won't stop the documents correctly in the Accumulator.

IMPORTANT:
Gap Setting for Clutch – Preset
Gap Setting for Brake – .005"
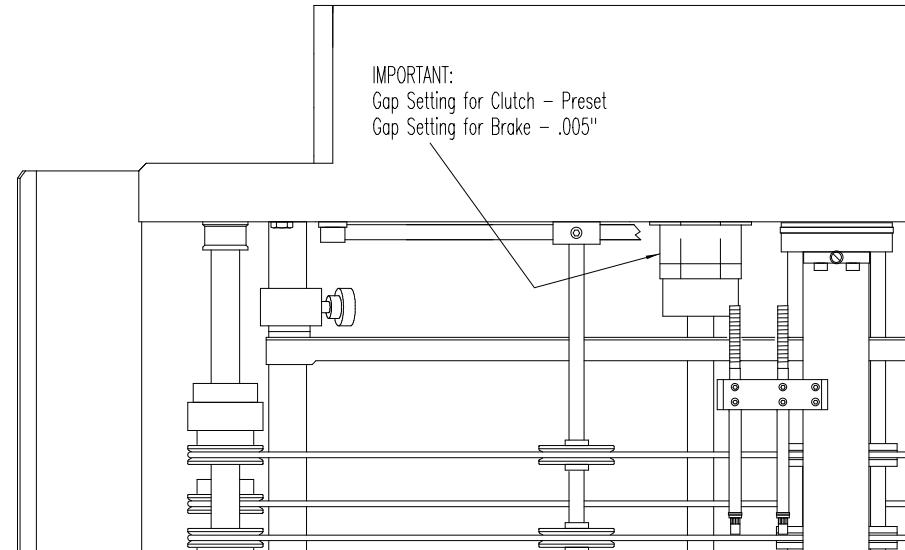
ACCUMULATOR CLUTCH & BRAKE SETTING

D.4c   Accumulator Dump Roller Replacement

To replace the dump rollers it is first necessary to disconnect the accumulator from the folder:

1. Disconnect all electrical connectors to the feeder

2. Remove the left feeder cover

3. Loosen the two thumbscrews that latch the feeder to the accumulator

4. Loosen the accumulator to feeder drive belt tensioner and remove belt

5. Move feeder out of way

6. Remove both accumulator side covers

7. Remove the lower fold plate sliding cover by first removing the two stop screws on the slide track

8. Remove the green folder to accumulator drive belt

9. Carefully remove all wire ties for left side folder to accumulator terminal block wire bundle

10. Place a table beside the folder (must be within +/- 3" in height of the bottom of the accumulator)

11. Remove the two nuts that secure the accumulator to the folder

12. Carefully pivot the accumulator onto the table beside the folder

REPAIR CHECKOUT PROCEDURE FOR STACK SENSOR

STACK SENSOR - REFER TO SECTION F "ACCUMULATOR".

Enter the TEST menu from the VIP display. Select INPUT from the submenu and select Stack Sensor input. Repeatedly block the stack sensor with your hand or a piece of paper. As the sensor is blocked, the audible beep is heard and opto 0:1 (opto module 1 on opto rack 0) red LED illuminates each time the sensor is blocked, and goes out when the sensor is unblocked?

Y   **N** - Check a different input to ensure the audible signal on the display is working.
Y   **N** - Check input opto 0:1 (opto module 1 on opto rack 0). Does LED light when sensor is blocked?
　　　　Y   **N** - Check the wiring between the stack sensor and the opto rack. If the wiring required correction, does this correct the problem?
　　　　Y   **N** - Check the pico fuse of the opto module. Replace the input opto module if necessary and repeat the test. Does the LED illuminate?
　　　　Replace the CPU 486 PWB.
　　Run the machine.
Check the paper transport. Are belts carrying paper?
Y   **N** - Adjust the transport belts.

REPAIR CHECKOUT PROCEDURE FOR ACCUMULATOR SENSOR

ACCUMULATOR SENSOR - REFER TO SECTION F "ACCUMULATOR".

Enter the TEST menu from the VIP display. Select INPUT from the submenu and select Acc Sensor input. Repeatedly block the accumulator presence sensor with your hand or a piece of paper. As the sensor is blocked, the audible beep is heard and opto 0:18 (opto module 18 on opto rack 0) red LED illuminates each time the sensor is blocked, and goes out when the sensor is unblocked?

Y   **N** - Check a different input to ensure the audible signal on the display is working.
Y   **N** - Check input opto 0:18 (opto module 18 on opto rack 0). Does LED light when sensor is blocked?
         Y   **N** - Check the wiring between the accumulator sensor and the opto rack. If the wiring required correction, does this correct the problem?
                 Y   **N** - Check the pico fuse of the opto module. Replace the input opto module if necessary and repeat the test. Does the LED illuminate?
                 Replace the CPU 486 PWB.
         Check the stack sensor.

REPAIR CHECKOUT PROCEDURE FOR ACCUMULATOR DUMP CLUTCH

ACCUMULATOR DUMP CLUTCH - REFER TO SECTION F "ACCUMULATOR".

Enter the TEST menu from the VIP display. Select OUTPUT from the submenu and select "Acc Dump Clutch" output. Repeatedly press the ENTER key and note whether the clutch engages (feel with fingers or listen for click). As the clutch engages, observe opto 0:20 (opto module 20 on opto rack 0). Does the red LED illuminate each time the clutch engages, and go out when the clutch disengages?

Y   **N** - Check the wiring between the accumulator dump clutch and the opto rack. If the wiring required correction, does this correct the problem?

     Y   **N** - Check the pico fuse of the opto module. Replace the output opto module if necessary and repeat the test. Does the clutch engage?

          Y   **N** - Does LED light when ENTER is pressed?

               Y   **N** - Check wiring to clutch

                    •   Replace the CPU 486 PWB.

Check the accumulator sensor.

D.5 FOLDER FUNCTION

D.5a Description

Fed by the Accumulator Section, the folder is capable of placing 1 to 5 folds in a C, Z, V or 7 double V configuration. (See Fold Capacity Chart at the end of this manual). Adjustable buckle plates set the distance of the fold from the edge of the paper. Fold rollers nip the paper as it is buckling, creating the fold. A 110VAC motor drives all folder shafts and rollers. The folder speed encoder, located on the infeed roller shaft, provides a folder speed signal.
Depending of the particular configuration, document(s) exit the folder one of three ways:

1. Shingling conveyor stacker. The stacker allows easy continuous removal of document(s) while avoiding any loss of sequence.
2. Buffered transfer conveyor where nest folded document(s) are placed in an open inserter feed/gripper arm station.
3. 3. Transfer conveyor where the nest folded document(s) are presented to the gripper arm.

D.5b Fold Principle

The folder works on the buckle fold principle using a fold plate and fold rollers.

Fold rollers 1 and 2 drive the sheet into the fold plate until it comes up against the adjustable stop. The trailing edge

of the sheet continues to be advanced by the roller and the sheet is buckled. The sheet is now grasped by fold rollers 2 and 3.

Note: The fold rollers are made of polyurethane foam material. Do not wash the rollers with any cleaning fluid. This will destroy the anti-static coating and folding problems will occur. Clean using a stiff brush, but no liquids of any kind.

The rollers pull the folded sheet out of the fold plate and the pair of fold rollers and carried to the next fold plate.

After the last fold, the sheet is transferred by the delivery rollers to the delivery belt.
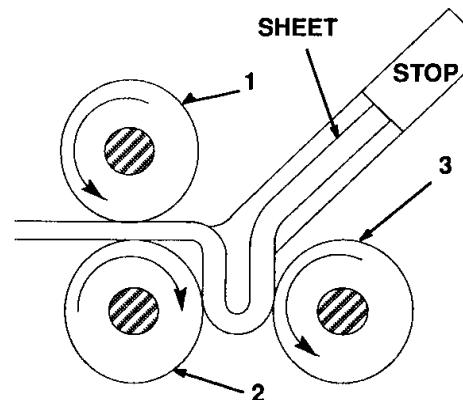
Fold Roller Diagram Figure

D.5c   Components of the Fold Unit

Components and operating elements of the fold units:

1. Noise covers

2. Paper thickness measuring device

3. Fold roller adjustment knobs

4. –

5. Handwheel

6. Main switch
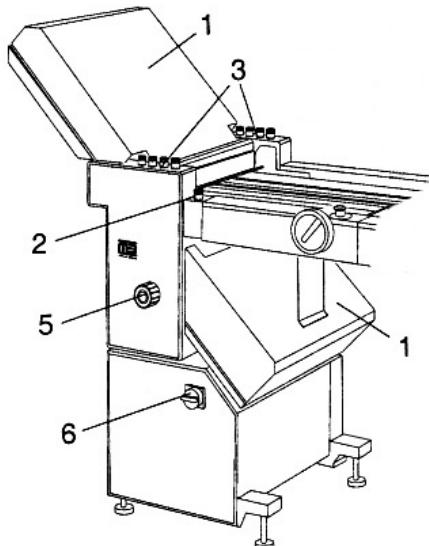
D.5d   Fold Plate Positions

In the fold unit 38/4 there are four positions for the fold plates:
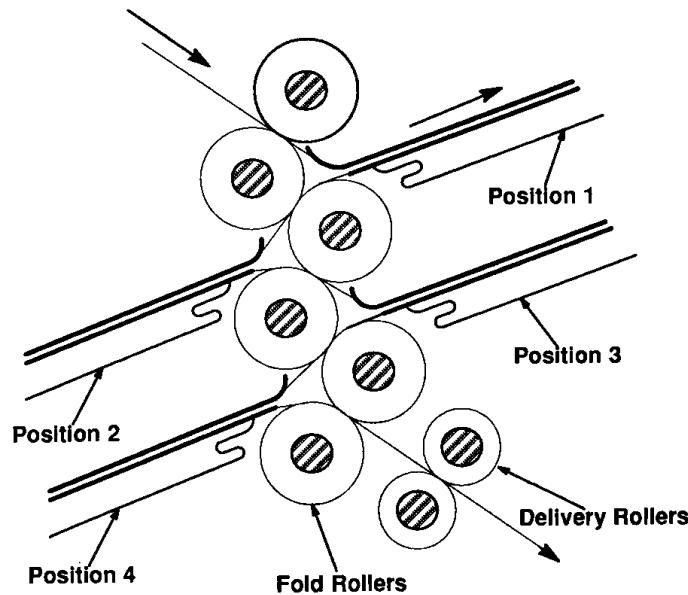
Fold Roller Diagram Figure

D.5e   Position the Fold Plates and Deflectors

- The Fold plates and deflectors have one lock screw (1) each at the left- and right-hand side.
- Insert the fold plates and deflectors in such a way that the lock screws (1) fit in the recesses (2) in the frame of the fold unit.
- Secure the fold plates and deflectors by tightening the lock screws.
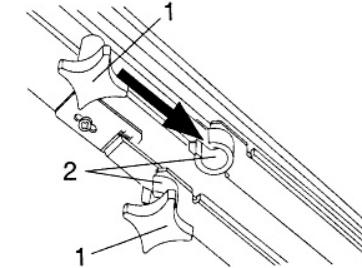
D.5f   Setting the Fold Length UFT 38

- Loosen the lock scew for the paper stop (3).
- Set the stop to the required position on the scale (5) by turning the adjustment wheel (4).
- Secure the fold plate stop by turning the lock screw clockwise.
- By turning the fine adjustment screw (6), the fold length can be adjusted precisely with the machine running.

⇒ Adjustment by means of the fine adjustment screw is only possible when the lock screw for the fold plate stop has been tightened.
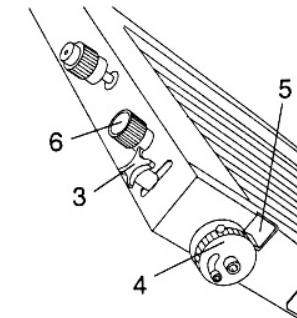
- By turning the knurled knobs of the adjustment wheel (1) it is possible to make angle corrections of the paper stop, for example if the paper is out-of-square.
- The combination fold plate UFT 38 has a fold plate infeed section with an adjustable lower lip. This means that the space available to form the buckle can be modified depending on the thickness and the stiffness of the paper.
  The lower lip is moved by turning a fine adjustment screw (2) which is equipped with a scale.
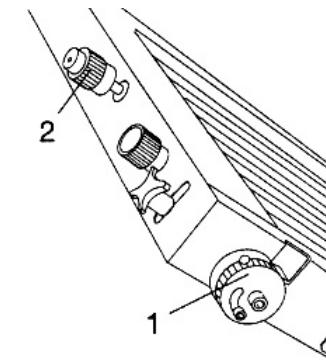
  Light paper grades: move the lip forward by turning the screw counter-clockwise.
  Heavy paper grades: move the lip backward by turning the screw clockwise.

- For difficult-to-handle paper it is possible to set back the complete fold plate by up to 4 mm. For this, two Allen screws (9) have to be loosened at the left and right side of the fold plate. A scale (10) facilitates precise setting.
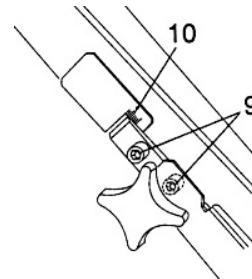
D.5g   Close Fold Plate UFT 38

If the fold plate is not used and must therefore be closed, it can stay in the fold unit.
- Set the fold plate stop to the maximum fold length (highest position) by turning the setting wheel (1).
- Continue turning the adjustment wheel against a slight resistance unit the stop is reached; now the deflector is engaged and the fold plate is closed.

D.5h   Setting the Fold Length

Fold unit with four fold plates:
⇒The type of fold determines the position of the fold plates and deflectors.
The unfolded format determines the fold lengths to be set.
The fold length is the distance between paper stop and fold line.

Type of fold	Fold length	Fold plate setting	DIN A4 210 x 297	DIN A3 297 x 420
Single fold	1 = 1/2		1 = 148 2 = 0 3 = 0 4 = 0	1 = 210 2 = 0 3 = 0 4 = 0
Letter fold	1 = 2/3 2 = 1/3		1 = 198 2 = 99 3 = 0 4 = 0	1 = 280 2 = 140 3 = 0 4 = 0
Accordion (Z) fold	1 = 1/3 2 = 1/3		1 = 99 2 = 100 3 = 0 4 = 0	1 = 140 2 = 141 3 = 0 4 = 0

For accordion folds, fold plate stops should be set so they increase by 1 mm from one fold plate to the next.

8-page accordion fold	1 = 1/4 2 = 1/4 3 = 1/4		1 = 74 2 = 75 3 = 76 4 = 0	1 = 105 2 = 106 3 = 107 4 = 0

For accordion folds, fold plate stops should be set so they increase by 1 mm from one fold plate to the next.

Setting Guide for Common Types of Fold

D.5i   Setting the Fold Roller Gap

Each folder is equipped with a paper thickness measuring device (1).
Before setting the fold roller gap, clamp the respective paper between the rollers and read the paper thickness of the scale.
The fold roller gap is set by means of setting screws which are numbered.
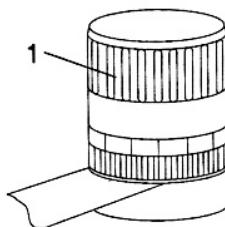
Roller 1	is the	**feed roller**
Roller 2	makes the	**1ˢᵗ fold**
Roller 3	makes the	**2ⁿᵈ fold**
Roller 4	makes the	**3ʳᵈ fold**
Roller 5	makes the	**4ᵗʰ fold**
Roller 6	makes the	**5ᵗʰ fold**
Roller 7	makes the	**6ᵗʰ fold**
Roller 8	is the	**delivery shaft**

This layout shows a fold unit with 6 fold plates.

⇒Rollers 6 and 7 are not part of fold units with 4 fold plates. The delivery shaft would then be number 6.
⇒Rollers 4, 5, 6 and 7 are not part of fold units with 2 fold plates. The delivery shaft would then be number 4.

The basic principle of buckle plate folding has to be considered when choosing the correct setting of the fold rollers.
There are two different types of fold:
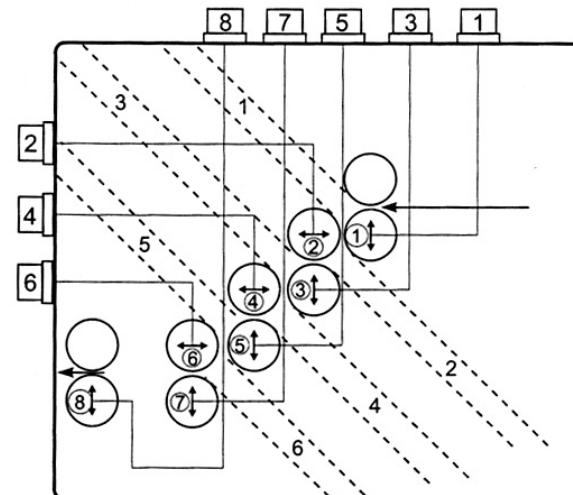
Folds with **always symmetrical** panels.
Folds with **partly asymmetrical** panels.

Folds with *always symmetrical* panels:
If the panels of a folded sheet always have the same length when passing through the fold rollers, the gap to be set for the respective fold roller depends on the number of paper layers which have left the preceding fold plate.

Folds with *partly asymmetrical* panels:
If the panels of a folded sheet are of **unequal** length when passing through the fold rollers (accordian fold, letter fold in fold plates 1 and 2), the gap to be set is governed by the number of paper layers contained on the longer panel.

D.5j   Fine Adjustments and Corrections

Fold Length

Fold variations may occur if the fold plate stops are not set accurately of if the folding speed is changed. The fold is off across the whole width of the sheets (as opposed to a skewed fold). Corrections of the fold length are made by turning the fine adjustment knob (1).

$\Rightarrow$ A change in the folding speed also changes the fold length. Therefore the set-up speed must be maintained.

Skewed Folds

Skewed (out-of-square) folds occur when the paper is fed not at the right angles with respect to the fold rollers. This can be corrected as follows:

- Mark the leading edge of a sheet and feed it through the fold unit (2).
- To make the deviation more obvious, exaggerate the skewed fold by hand (3).
- Open the folded sheet and place it in front of the roller infeed section (4).
- Adjust lower dump rollers on exit end of accumulator through hole indicated.

LOWER DUMP ROLLER
ADJUSTMENT HOLE (2X)

UFT 38
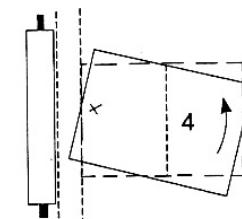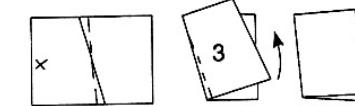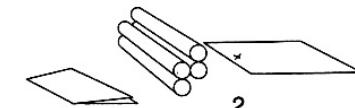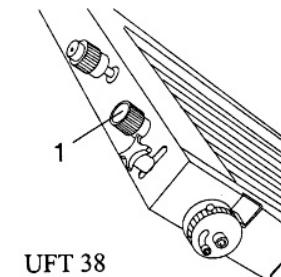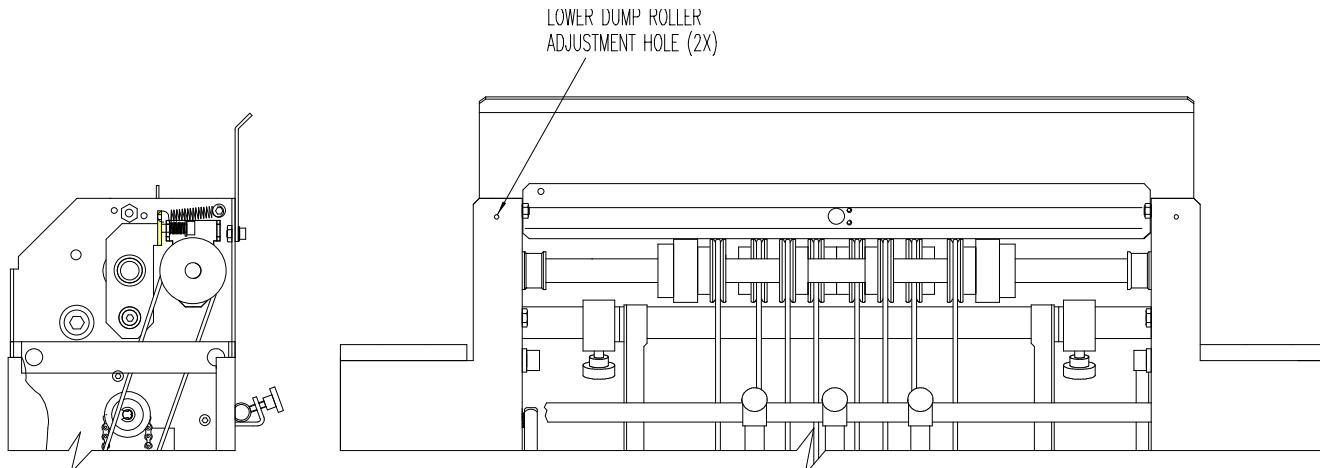
Out-Of-Square Paper

If the paper is not cut precisely at right angles, the folded sheet may show "points". By turning a setting screw, the fold plate stop can be made parallel to the out-of-square paper.

Note: Make this correction only on the first fold plate.
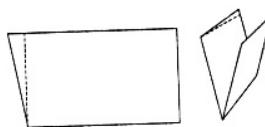
Correction on combination fold plate UFT 38:

It is possible to change the parallelism of the stop by turning the knurled knob (1).

- Loosen the knurled knob by means of a 4-mm Allen key (2). The angle of the stop is changed by turning the two knurled knobs. The stop is parallel to the fold rollers when the two half-round marks (3) face each other.
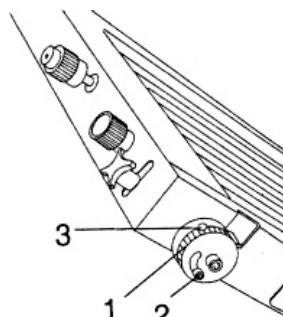
Shadow Fold (UFT 38)

The lower lip can be adjusted by setting knob (5).

Basic position:
"0" is flush with the top of the knob.

Lower lip advanced:
Small buckle space, setting knob "-".
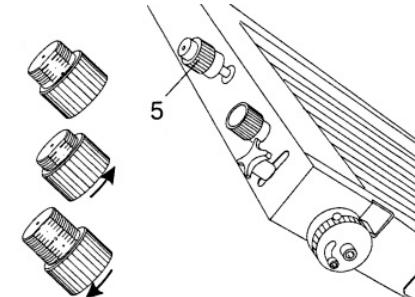
Lower lip set back:
Large buckle space, setting knob "+".

- Thin paper grades: Advance lower lip, "-".
- Heavy paper grades: Set back lower lip, "+".

Accordion Fold

It is possible that heavy paper grades get stuck and form a so-called "accordion fold". In such a case the fold plates must be set back.
- Loosen the Allen screws (6) both sides of the fold plate.
- Set back the fold plate using the scale (7).
- Tighten the Allen screws.
- Change the fold stop plate by the same amount.
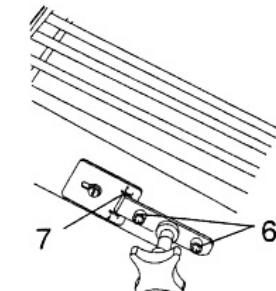
Creasing

When special types of paper are folded, deviations from the nominal values may become necessary.
Individual corrections can be made by means of the numbered setting knobs at each roller.
The fold rollers and delivery shafts with the matching setting knobs are arranged according to the following scheme:

Roller 1	is the	**feed roller**
Roller 2	makes the	**1st fold**
Roller 3	makes the	**2nd fold**
Roller 4	makes the	**3rd fold**
Roller 5	makes the	**4th fold**
Roller 6	makes the	**5th fold**
Roller 7	makes the	**6th fold**
Roller 8	is the	**delivery shaft**

This layout sketch shows a fold unit with 6 fold plates.
⇒Rollers 6 & 7 are not part of the fold units with 4 fold plates. The delivery
 shaft would then be number 6.
⇒Rollers 4, 5, 6 & 7 are not part of folder with 2 fold plates. The delivery shaft would then be number 4.

⇒The setting knobs are equipped with scales (1). With their help settings with a precision of 0.1 mm are possible.
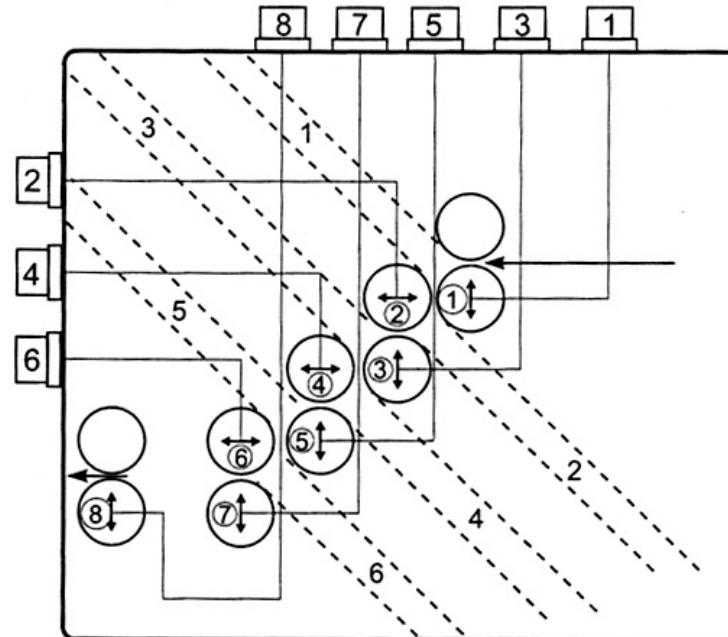
An additional scale (2) indicates adjustments of 0.5 mm.
One turn of the setting knob changes the roller gap by 0.5mm.
To increase the roller gap, turn the setting knob counter-clockwise.
When the roller gap is changed by more than 0.5mm, the values on both scales must be added.
Example: 0.5 (2) + 16 (1) = 0.66 mm
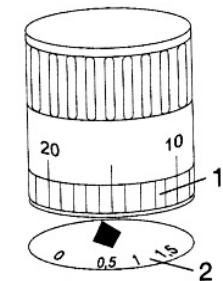
STANDARD FOLDER SETUP FOR 438 APPLICATIONS

#6   #5   #3   #1   ——— THESE NUMBERS ON DIAL

30   40   5   20

#2   30   ◇ 0   0   0   0   0.5

#4   30   ◇ 0

Standard 438 Folder Knob Setup
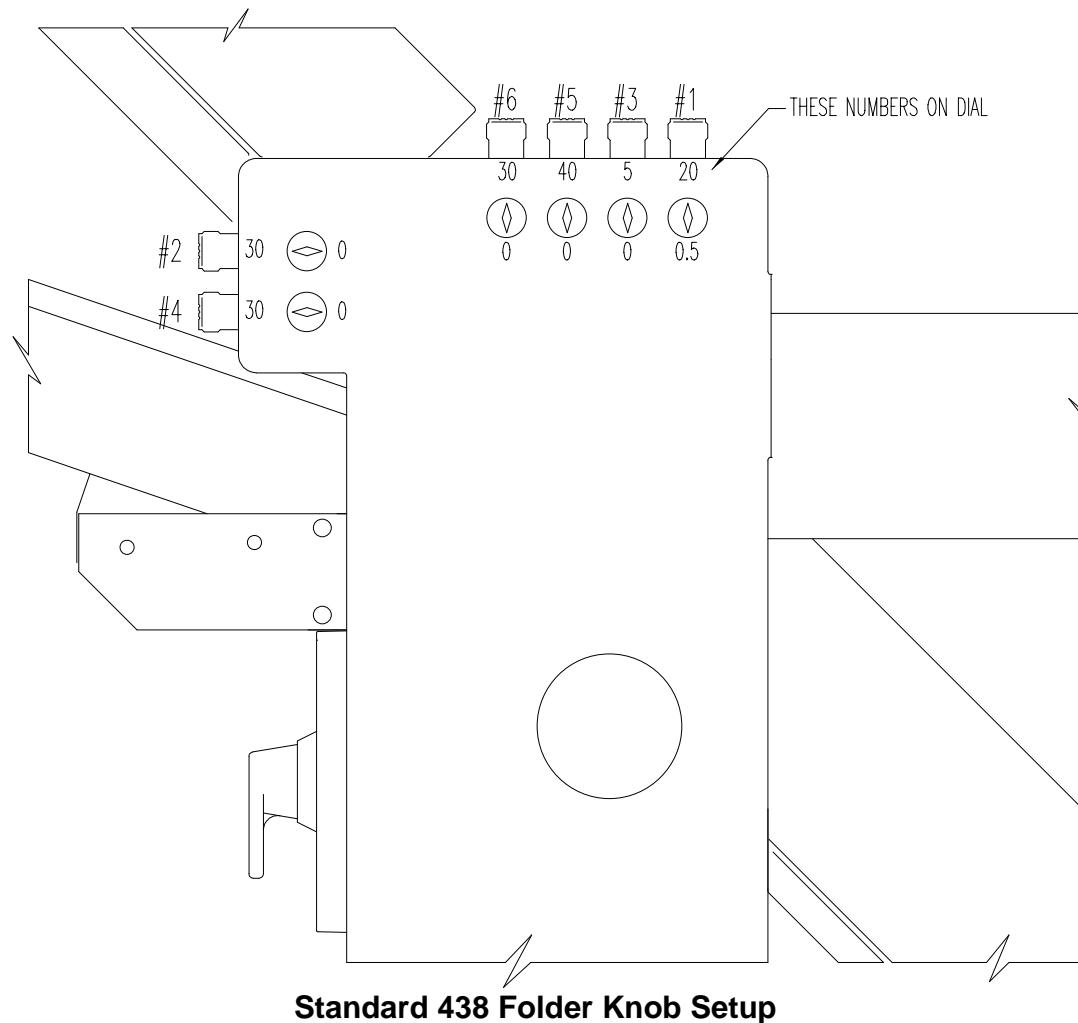
D.6   TRANSFER CONVEYOR

D.6a   Description

The transfer conveyor is an articulated belt system which presents the nest folded document(s) to the Inserter gripper arm.

D.6b   Timing

Demand switch on/off timing is critical. The setup of this timing permits the 438 to achieve optimal handoff to the Inserter.

The Demand switch should turn on (contacts closed) when the gripper arm is approximately perpendicular to the deck of the Inserter. The Demand switch should then turn off (contacts open) as the gripper arm completes it's backwards motion and starts moving toward the Transfer conveyor.

This timing setup is also used to adjust dwell time for the "Open Feed" option.

Move Closer To
Increase Duration

To PF300
Folder

Loosen Set
Screws To Rotate
Block

Magnets Slide
To Change
Duration

Magnetic
Reed Switch
Block

Magnet Block:
Rotate For
Proper Timing

③   ②   ①

X

(Switch Enlarged
at Left)

X=1 Pack
Length

① Point at which gripper arm takes pack
② Demand switch turns ON
③ Demand switch turns OFF
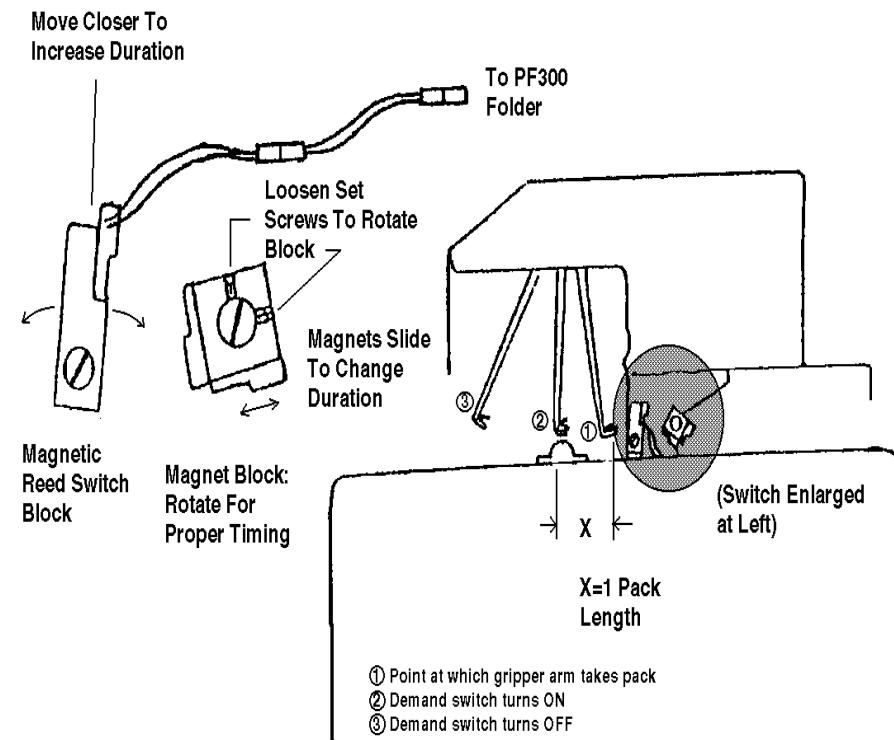
Transfer Conveyor Demand Switch Figure

D.6c Exit sensor Test on the Transfer conveyor

The Exit sensor on a 438 creates an interrupt to the control card. This interrupt is what permits accurate positioning of packages on the Transfer conveyor. Testing the interrupt communication is done in the following manner:

1.   Clear Transfer conveyor of all documents

2.   Place a folded document approximately 1/2 inch before the Exit sensor on the Transfer conveyor.

NOTE: Be sure the inserter is running to supply a Demand signal.

3.   Run the 438 and command the machine to Dump.

4.   The Transfer conveyor will index in response to the Dump command. If the package that was placed just before the exit sensor stops at the discharge end of the Transfer conveyor the interrupt is being seen by the control card. However if the document is throughout the end of the Transfer conveyor then the interrupt is not being seen by the control card.

NOTE: The Interrupt signal enters the Control card CPU-486 at header J9. The signal comes from J10: a 50-pin, in-line ribbon cable header.

D.6d 438 configuration of Exit sensor module

The Exit sensor amplifier module on the Transfer conveyor has an "active state" selection switch on it. This switch can set to LIGHT ON or LIGHT OFF. The proper position for the switch is LIGHT ON.

NOTE: This active state setting is the opposite to most of the other sensor modules on the 438.

SENSOR MODULE   EXIT SENSOR
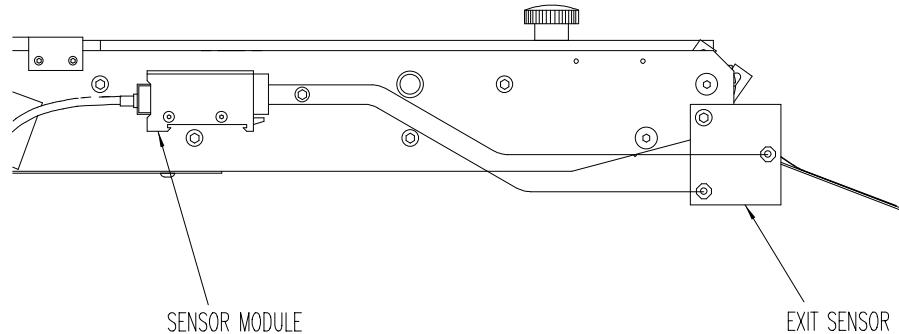
Transfer Conveyor Exit Sensor Figure

D.6e   Package overhang at last station

When a package is being presented to the gripper arm (last station of the Transfer conveyor) the package should have only the trailing edge of the folded document held by the flat green belts. Positioning the trailing edge of the document at the centerline of the lower, forward-most shaft accomplished the desired document position.

When the gripper arm removes a package from the Transfer conveyor the flat green belts of the Transfer conveyor will creep if more than 3/4 of inch of the package is being pinched by the flat green belts. The creeping of the flat green belts will cause the packages to become improperly gapped in the Transfer conveyor.

TRAILING EDGE OF DOCUMENT
POSITIONED AT CENTERLINE
OF THIS SHAFT
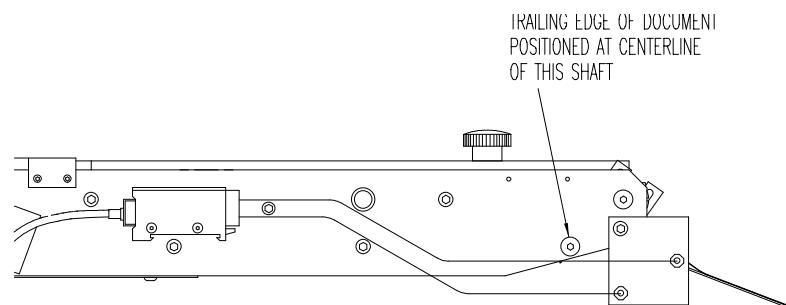
Transfer Conveyor Figure

D.6f   Transfer conveyor's outfeed guides position

It is recommended that the Transfer conveyor arm be positioned parallel to the deck of the inserter and it should be close enough to the deck so the outfeed guides do not need to drastically deflect the folded document. This will help prevent the flat green belts from creeping and ease the extraction force required to remove the folded document.

SMART
FEEDER

INSERTING MACHINE

GOOD POSITION   POOR POSITION (PACK TOO LOW)   POOR POSITION (PACK
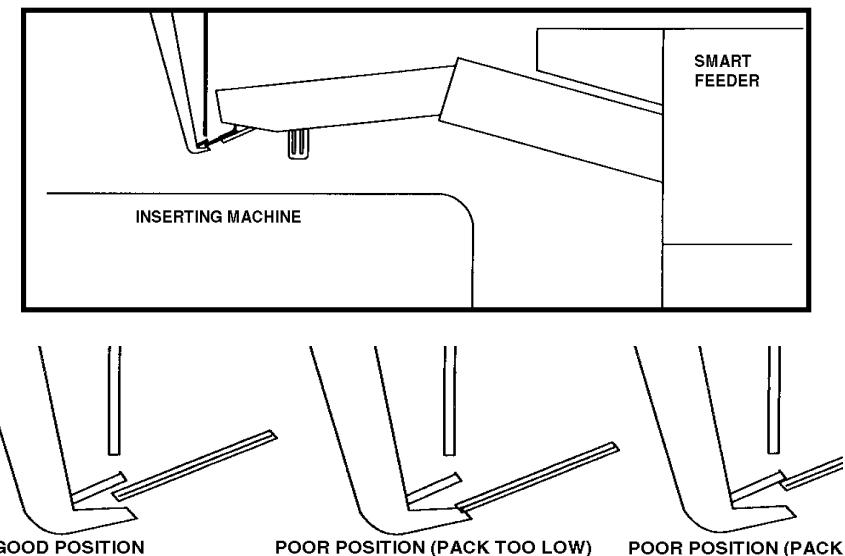
D.6g   Fold quality

Consistent fold quality is required or the package size can vary enough to cause the Transfer conveyor packages to be improperly positioned in the conveyor.

D.6h   Transfer conveyor package spacing problem

If package spacing problems occurs in the Transfer conveyor it should be purged of all the remaining documents in it. This will insure that documents will be properly positioned.

D.7   POWER UNIT
REFER TO SECTION F "POWER UNIT" SCHEMATIC.
The Power Unit is located inside the cabinet and consists of the following components:
1.   Master Relay: Electric safety interlock switch.

2.   Fuses: Fuse tips illuminate when the fuse is bad

3.   Solid State Relays (SSR): For switching high power items, motors, etc.

4.   5 VDC Power Supply (PS1)

5.   +12VDC and -12VDC power (PS1)

7. +24 VDC Power Supply (PS1)

SECTION E - PRINTED WIRING BOARD INFORMATION

SECTION E - PRINTED WIRING BOARD INFORMATION 1

E.1 CPU 486(MCM-DX) CARD

GBR Part Number: 042-26932-500

E.1a Features

- Processor Rates of 25 to 50Mhz and up to 100Mhz using clock doubled CPU's
- Full PC/AT Hardware/Software Compatibility
- 16-Bit PC/104 Expansion Bus
- Up to 32 Mb of ruggedized onboard DRAM
- Two Serial Ports with RS-232/RS-422RS-485 capability
- Standard Centonics Parallel Printer Port
- Watchdog Timer with Power Fail Reset
- 16-Bit Dual IDE Disk Interface
- +5 Volt only operation

E.1b General Description

The MCM-DX is a small, high-performance embeddable computer system on a single STD-BUS board. It can be populated with any of the popular '486 Family of chips. It's full PC/AT hardware complement and industry standard AWARD BIOS assures full hardware and software compatibility with PC software and operation systems. The MCM-DX includes onboard interfaces for floppy disks, IDE fixed disks, parallel printer, and two serial channels with RS-232, RS-422, or RS-485 capability on either or both channels. A full 16-Bit PC/104 expansion BUS is provided in addition to the STD-Bus interface for further expansion to an entire industry of add on peripherals including high speed

VGA controllers, sound and speech modules, SCSI controllers, and literally hundreds of other options available form WinSystems and variety of vendors supporting the PC/104 standard. Up to 32-megabytes of factory installed DRAM is supported on board. An onboard Silicon Disk socket supports a solid-state disk of up to 1 Megabyte in size and can utilize SRAM, PEROM (Flash), EPROM or the M-Systems Disk-On-Chip as the disk media. Boot capability is provided onboard and a setoff utilities and drivers are provided to make silicon disk based system very user friendly.

E.1c Specifications

Electrical

Bus Interface: STD-8088/188 Compatible
PC/104 8-bit/16-bit expansion bus
System Clock: Jumper Programmable form 2Mhz to 100Mhz
Interrupts: TTL Level input
VCC: +5V +/-5% at 930 mA typical at 40Mhz X 2 on a T1 486DX2 with 32 Mb DRAM
VCC1: +12V +/-5% (Not required. PC/104 or Cooling Fan Use Only)
VCC2: -12 +/-5% (Not required. PC/104 Use only)

Memory

Addressing: 64 Mb addressing (32Meg max onboard)
BIOS ROM Socket: 128Kb EPROM
DRAM Memory: 16 SMT J-lead locations on both sides of
                          the board supporting factory
                          configurations form1M to 32 Meg.
SSD Memory: One 32-pin JEDEC Standard socket
                          supporting 4-Mb SRAM, 4-Mb PEROM,
                          4-Mb EPROM, 16-Mb EPROM or the M-
                          Systems DOC Module.

Environmental

Operating Temperature: -40° to +70°C.
Non-Condensing Humidity: 5 to 95%

E.1d Configuration

- Jumpers as shown in diagram
- J1 to touch screen
- J1 to RS232 connector on cabinet bulkhead
- J16 to floppy drive
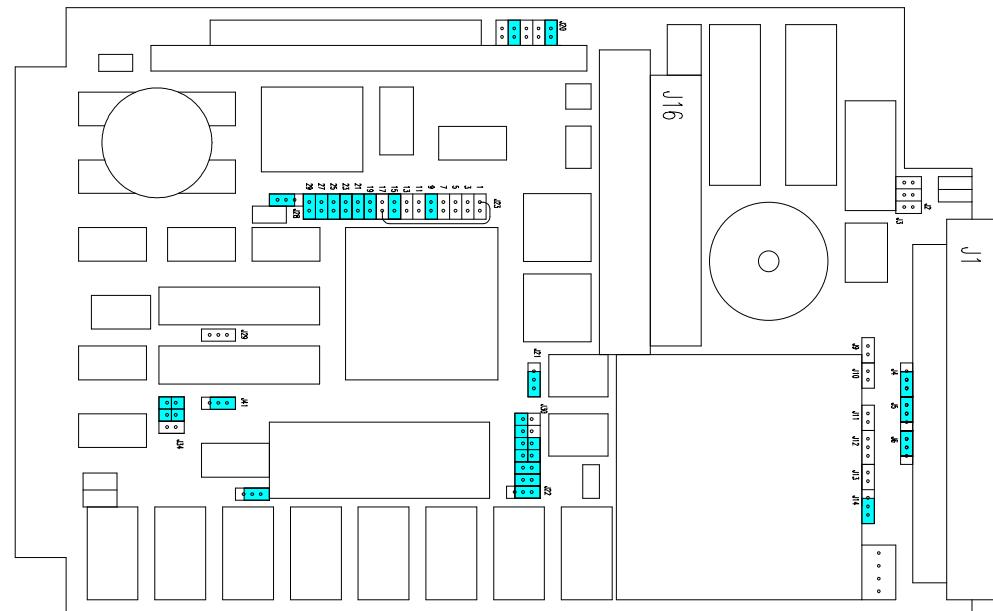
E.2 I/O 144 CARD

GBR Part Number: 042-26750-500

E.2a Features

- 144 Digital I/O pins per card
- Extensive Interrupt Capabilities, bit selectable
- Interrupt ID register for more efficient ISR's
- Each pin capable of sinking 12ma for use with Opto modules
- Read back / Input available for each pin
- 50 Pin connector directly interfaces to Opto Racks
- 5-volt only operation
- 8-bit STD Bus interface

E.2b General Description

The I/O 144 is a low cost high density I/O card with extensive interrupt capabilities.

For a given configuration, half of the pins have interrupt capabilities. Interrupts are programmable on a bit-by-bit basis for enable, and edge polarity.

All lines are Open Collector I/O. In addition, each group of 48 lines has a six-bit Write Mask register that allows the user to disable writes on a byte wide basis.

E.2c Specifications

Electrical

Bus Interface: STD-Bus & CMOS STD-Bus compatible
VCC: +5V @ 0.014mA / 0.090mA

Environmental

Operating Temperature: 0° to 65°C
Non-Condensing Humidity: 5 to 95%

E.2d Configuration

- Jumpers as shown in diagram
- J1 to left opto rack
- J2 to right opto rack
- J3 to the feeder brake
- J3 to ink mark sensor when applicable
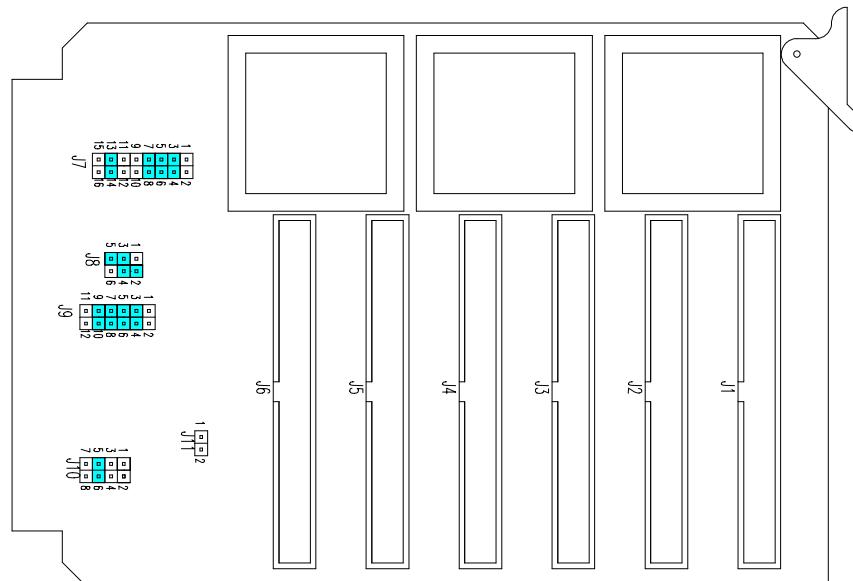
E.3 SVGA VIDEO CARD

GBR Part Number: 042-26746-000

E.3a Features

- Based on Cirrus Logic GD5420 Super VGA Controller Chip
- Industry Standard VGA BIOS
- STD-BUS Compatible
- ON BOARD EEPROM, stores monitor information

E.3b General Description

The MCM/LPM-SVGA is a high resolution, Super VGA STD-BUS video display board that provides low cost standard VGA. The PCM-VGA is based on the Cirrus Logic GD5420.

E.3c Specifications

Electrical

Bus Interface: STD-8088/188 Compatible
VCC: +5v +/-5% @250mA with 256K RAM.

Environmental

Operating Temperature: 0° to 70°C
Non-Condensing Humidity: 5 to 95%

Configuration

- J2 to Touch Screen
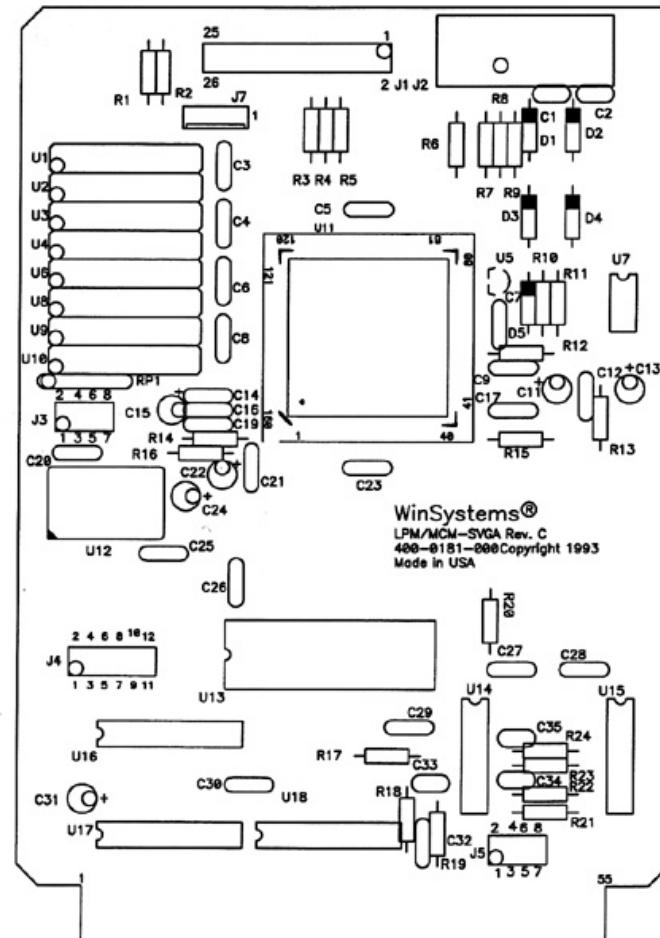
E.4 SERIAL CARD

GBR Part Number: 042-27623-500

E.4a Function:

- Provides additional serial communications
- Used with Bar Code Read

E.4b Configuration:

- Jumpers as shown in diagram
- J1 to Bar Code Reader
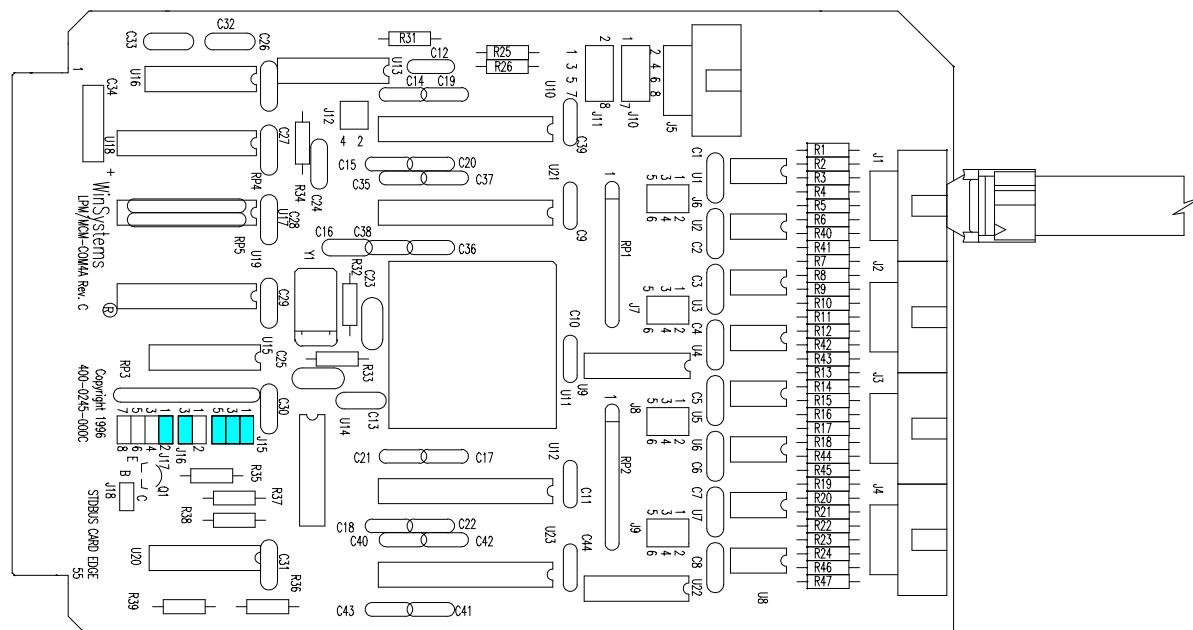
E.5 SINGLE CHANNEL READ CARD

GBR Part Number (w/GBR Line Code): 042-25272-500
GBR Part Number (w/B+H Line Code): 042-26908-500

E.5a Function:

- Interfaces with the BUS
- Processes signals from the GBR (TJ) or B+H Line Code Cards
- Processes Read Tachometer signal
- For B+H Line Read process edge detect and bar detect
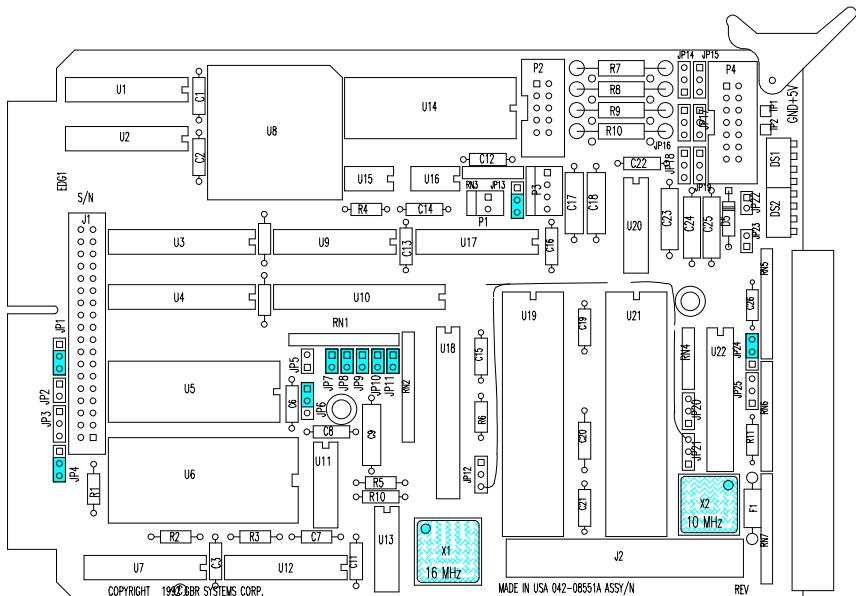
E.5b LED Indications:

The following LED indications apply only when using B+H line code.

LED 1   ON/OFF every second indicating operation (except when LED 2 is lit)

LED 2   ON indicates busy: line code read taking place, calibration read taking place, or machine speed sample being done.

LED 3   ON indicates line codes will be read using calibration data that has been stored. OFF indicates line codes will be read without using calibration data that has been stored.

LED 4   ON indicates line codes will be read using high tolerance read scheme. OFF indicates line codes will be read using low tolerance read scheme.

Note:
   LED's 1-4 are all turned on while the boot functions are being done. All the lights will stay on if a problem is detected in the hardware of the line code reader card.

LED 5   Input of lead edge detection sensor probe 1 (sensing paper LED off).

LED 6   Input of lead edge detection sensor probe 2 (sensing paper LED off).

LED 7   Not used.

LED 8   Input of selected line code sensor (Probe 1 or Probe 2).

E.6 GBR (TJ) LINE CODE CARD

GBR Part Number: 042-26622-500

This card is physically mounted on the Single Channel Read Card.

Function:

- Read Sensor Light source analyzer
- Read Signal amplifier

E.7 B+H READ CARD

GBR Part Number: 186-330002717

This card is mounted separate from the Single Channel Read Card but connected with cables.

Function:

- Read Sensor Light source analyzer
- Read Signal amplifier
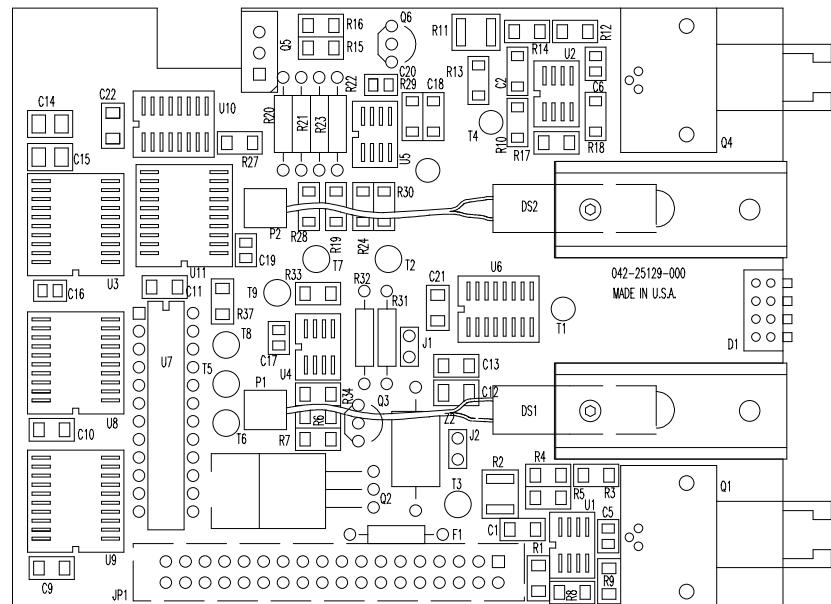
KEYBOARD MODULE #5
I/O BOARD

KEYBOARD

BLK P40-1   24V RETURN

J40   P40
BLK   1   BLK
RED   2   RED
WHT   3   WHT
GRN   4   ORN
ORG   5   ORN
BLU   6   BLU

POWER

CYCLE

DUMP

RED   RED   E-STOP
WHT   WHT
E-STOP   GRN KEY POWER ON   LEFT, OPTO #8-INPUT
           ORN KEY CYCLE   LEFT, OPTO #9-INPUT
           BLU KEY DUMP   LEFT, OPTO #10-INPUT

2 RED WHT
1

ON ADAPTER PLATE ASM
2 1 BLK   → TO DB37F INSERTER CONNECTOR PIN 30
       CLR → TO DB37F INSERTER CONNECTOR PIN 33
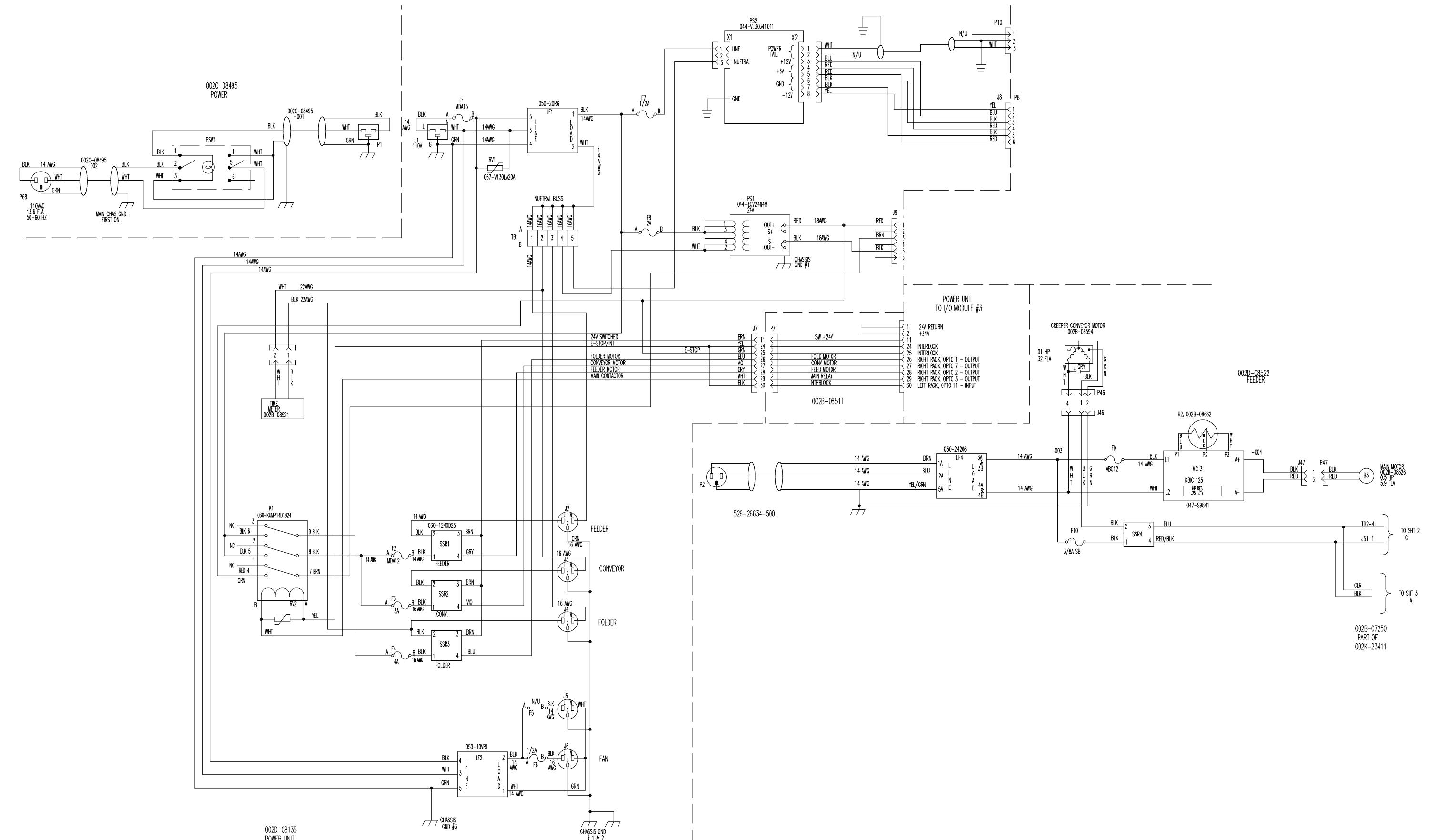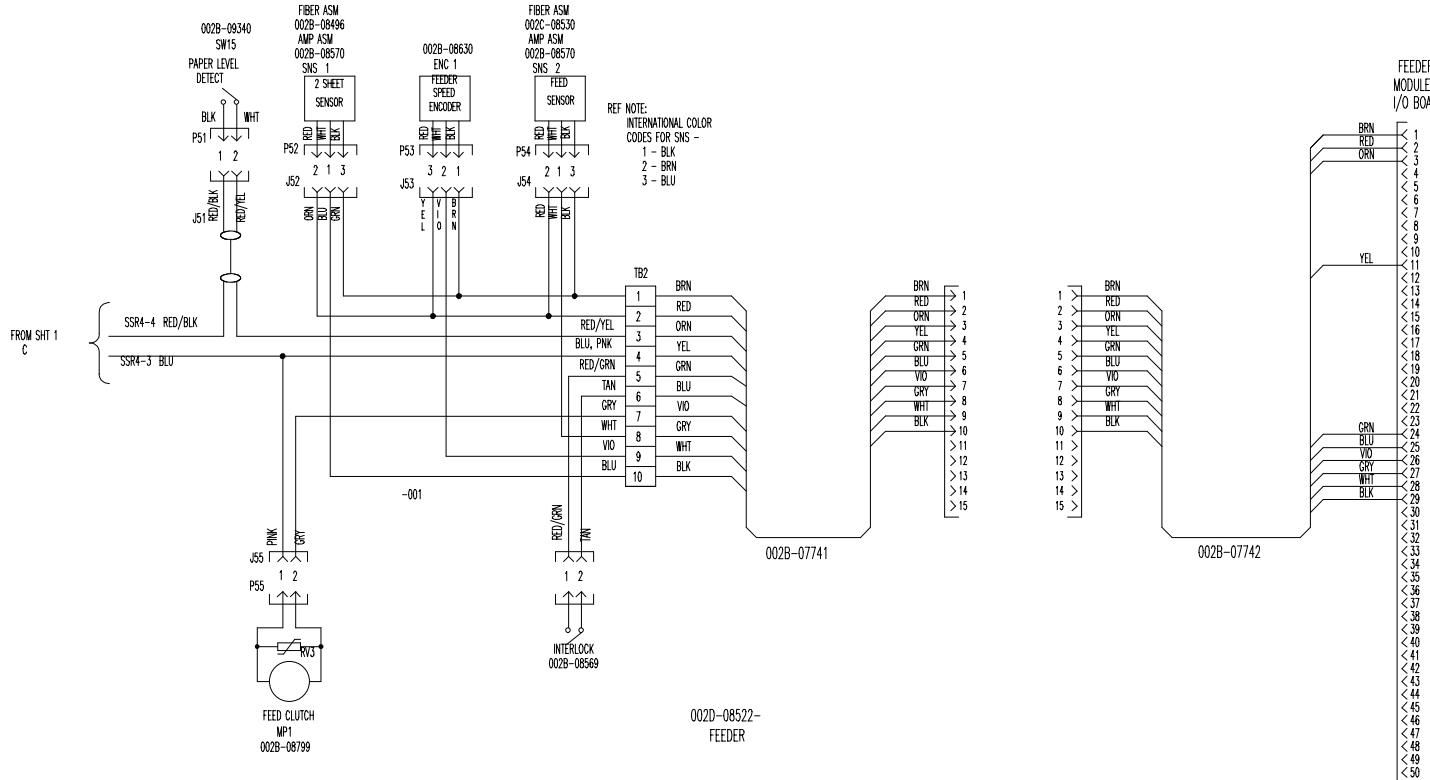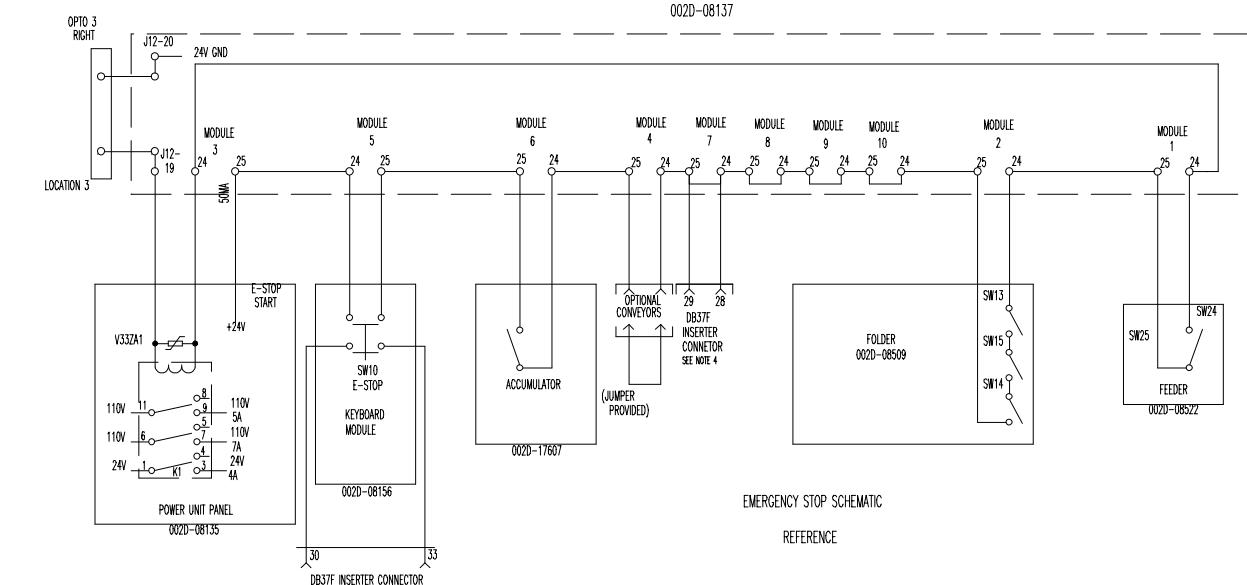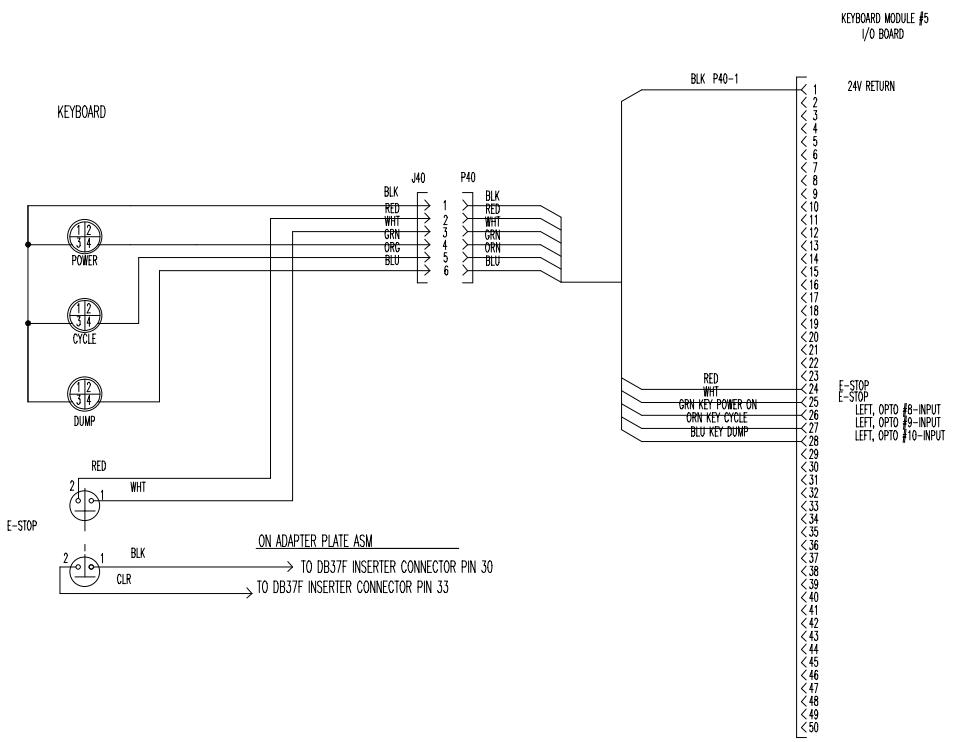
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50

OPTO 3 RIGHT
J12-20   24V GND
J12-19
LOCATION 3

002D-08137

MODULE 3   MODULE 5   MODULE 6   MODULE 4   MODULE 7   MODULE 8   MODULE 9   MODULE 10   MODULE 2   MODULE 1

V33ZA1
+24V
E-STOP START
110V   110V
110V   110V
24V   24V
K1

POWER UNIT PANEL
002D-08135

SW10 E-STOP
KEYBOARD MODULE
002D-08156

ACCUMULATOR
002D-17607

OPTIONAL CONVEYORS
(JUMPER PROVIDED)

DB37F INSERTER CONNECTOR
SEE NOTE 4

FOLDER
002D-08509

SW13
SW15
SW14

SW25   SW24

FEEDER
002D-08522

EMERGENCY STOP SCHEMATIC

REFERENCE

30   33
DB37F INSERTER CONNECTOR

FEEDER MODULE #1
I/O BOARD

002B-09340
SW15
PAPER LEVEL DETECT
BLK   WHT
P51
1 2
J51 RED/BLK

FIBER ASM
002B-08496
AMP ASM
002B-08570
SNS 1
2 SHEET SENSOR
P52 2 1 3
J52

002B-08630
ENC 1
FEEDER SPEED ENCODER
P53 3 2 1
J53

FIBER ASM
002C-08530
AMP ASM
002B-08570
SNS 2
FEED SENSOR
P54 2 1 3
J54

REF NOTE:
INTERNATIONAL COLOR CODES FOR SNS -
1 - BLK
2 - BRN
3 - BLU

FROM SHT 1
C

SSR4-4 RED/BLK
SSR4-3 BLU

TB2
BRN   1
RED   2   RED/YEL
ORN   3   BLU, PNK
YEL   4   RED/GRN
GRN   5   TAN
BLU   6   GRY
VIO   7   WHT
GRY   8   VIO
WHT   9   BLU
BLK   10

-001

RED/GRN
1 2

INTERLOCK
002B-08569

PNK GRY
J55
P55
1 2

RV3

FEED CLUTCH
MP1
002B-08799

002D-08522-
FEEDER

002B-07741

BRN   1
RED   2
ORN   3
YEL   4
GRN   5
BLU   6
VIO   7
GRY   8
WHT   9
BLK   10
      11
      12
      13
      14
      15

002B-07742

BRN   1
RED   2
ORN   3
YEL   4
GRN   5
BLU   6
VIO   7
GRY   8
WHT   9
      10
      11
      12
      13
      14
      15

BRN   1
RED   2
ORN   3
      4
      5
      6
      7
      8
      9
YEL   10
      11
      12
      13
      14
      15
      16
      17
      18
      19
      20
      21
      22
      23
GRN   24
BLU   25
VIO   26
GRY   27
WHT   28
BLK   29
      30
      31
      32
      33
      34
      35
      36
      37
      38
      39
      40
      41
      42
      43
      44
      45
      46
      47
      48
      49
      50

438 SCHEMATIC

438 SCHEMATIC

REFERENCE TABLE

| MODULE 1 – FEEDER |
| MODULE 2 – FOLDER |
| MODULE 3 – POWER UNIT |
| MODULE 4 – CONVEYOR |
| MODULE 5 – KEYBOARD |
| MODULE 6 – ACCUMULATOR |
| MODULE 7 – INSERTER |
| MODULE 8 – INFEED DEVICE |
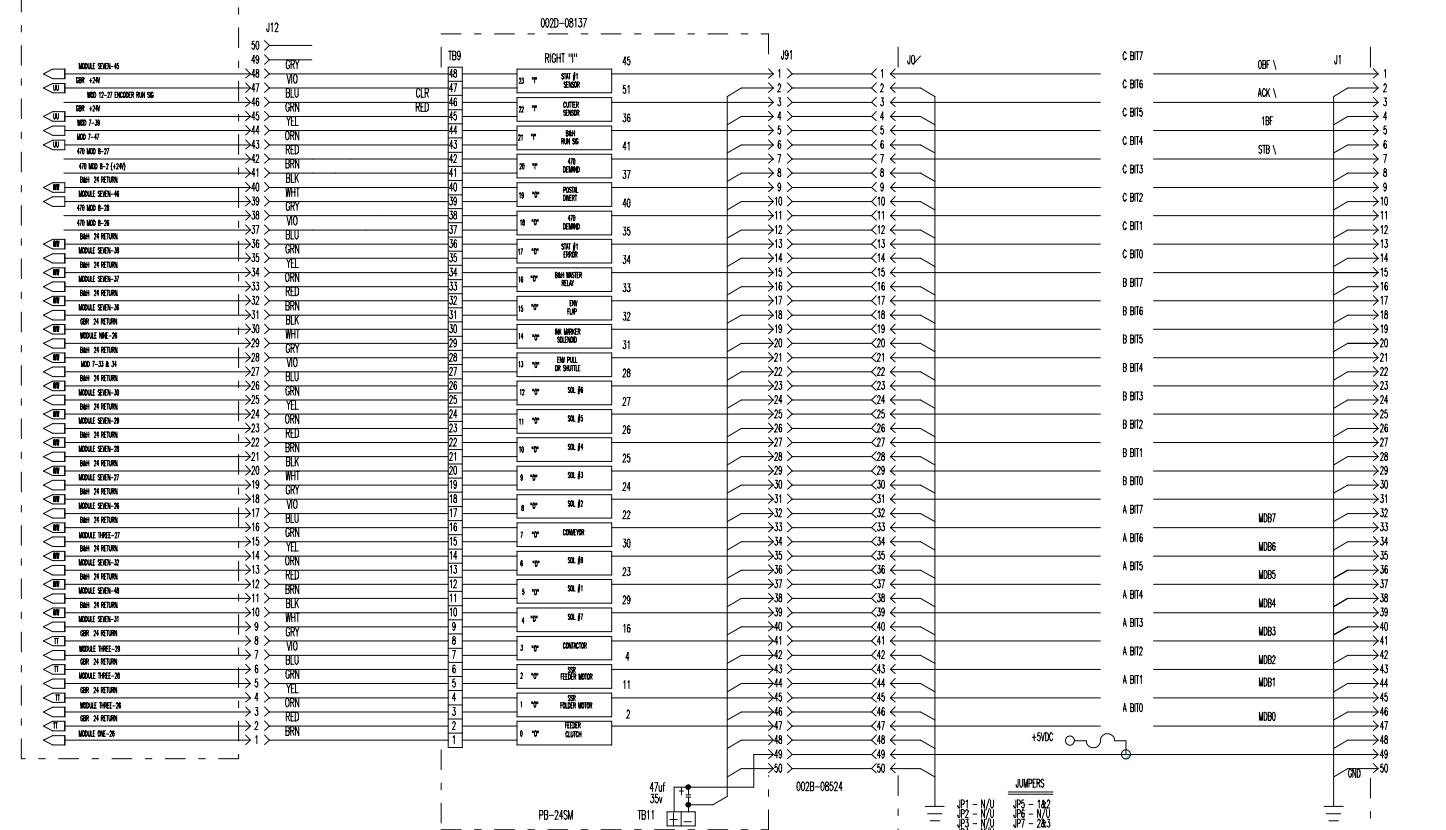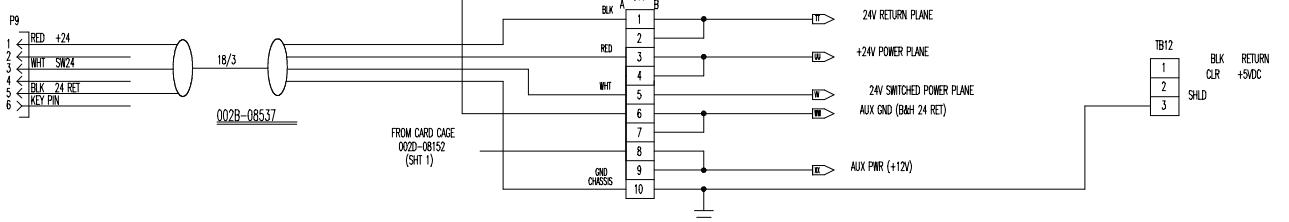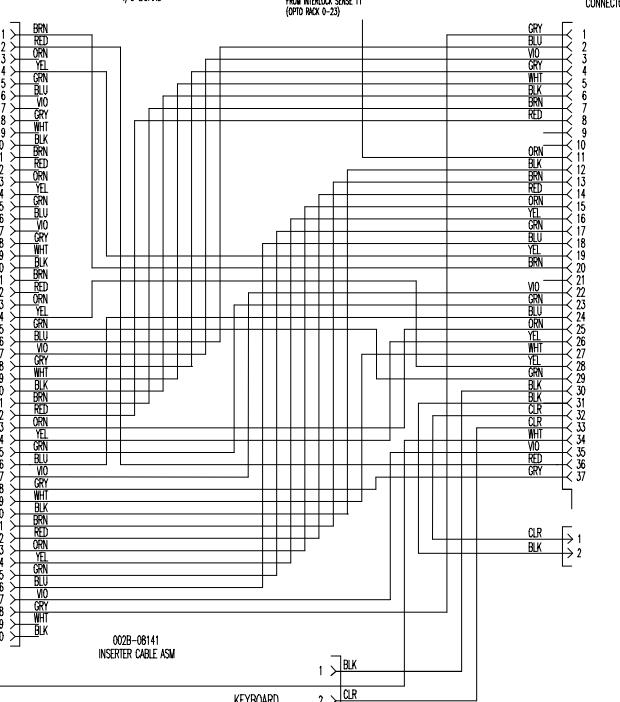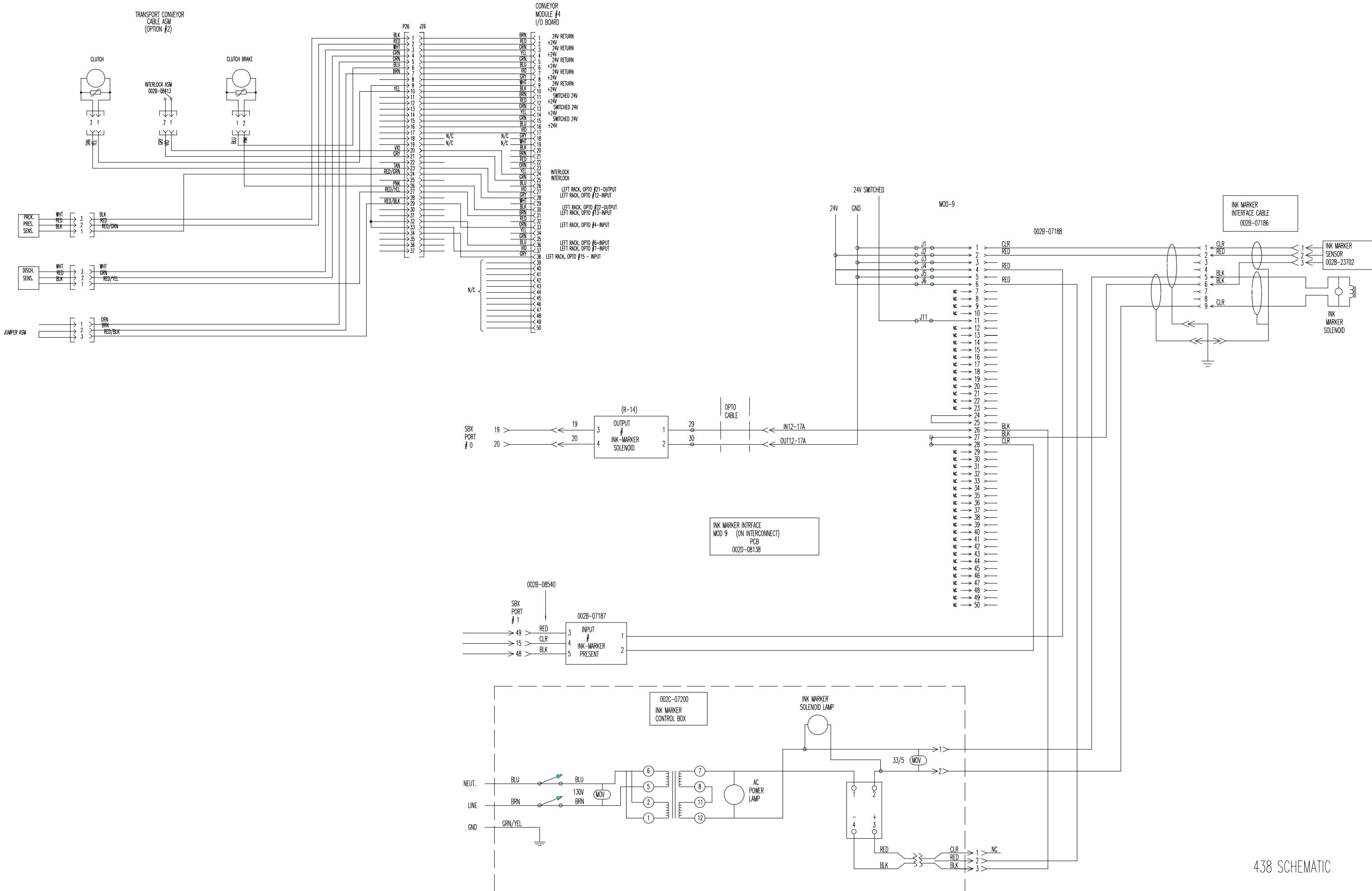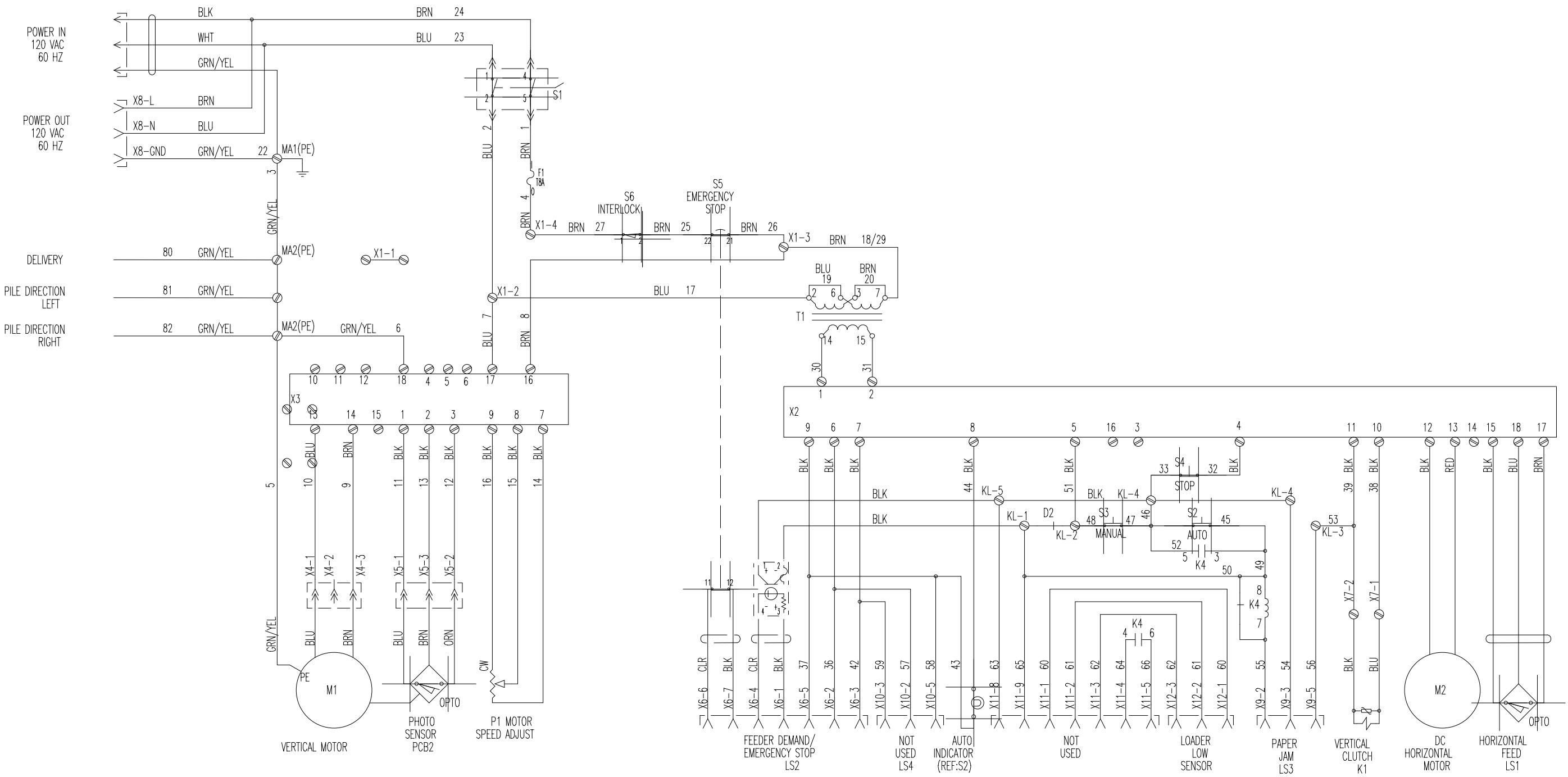
438 SCHEMATIC

470 BULK LOADER/FEEDER SCHEMATIC

POWER IN
120 VAC
60 HZ

BLK
WHT
GRN/YEL

BRN 24
BLU 23

X8-L BRN
POWER OUT
120 VAC
60 HZ
X8-N BLU
X8-GND GRN/YEL 22 MA1(PE)
3

S1
1 4
2 5

BLU 2
BRN 1
F1
T8A

S6
INTERLOCK
S5
EMERGENCY
STOP

X1-4 BRN 27 BRN 25 BRN 26 X1-3 BRN 18/29
22 21

DELIVERY 80 GRN/YEL MA2(PE) X1-1
BLU
19
BRN
20

PILE DIRECTION
LEFT 81 GRN/YEL X1-2 BLU 17
2 6 3 7

PILE DIRECTION
RIGHT 82 GRN/YEL MA2(PE) GRN/YEL 6
BLU 7
BRN 8
T1
14 15
30 31

X3
10 11 12 18 4 5 6 17 16
13 14 15 1 2 3 9 8 7

X2
1 2
9 6 7 8 5 16 3 4 11 10 12 13 14 15 18 17

BLU BRN BLK BLK BLK BLK BLK BLK
10 9 11 13 12 16 15 14

BLK BLK BLK BLK BLK BLK BLK BLK RED BLK BLU BRN
39 38

5
GRN/YEL

X4-1 X4-2 X4-3 X5-1 X5-3 X5-2

BLU BRN BLU BRN ORN

S4
STOP
33 32

44 KL-5 51 KL-4 KL-4
BLK BLK

BLK KL-1 D2 BLK S3 46 S2
48 MANUAL 47 45
KL-2 AUTO
52 5 49
K4 50

53 KL-3
X7-2 X7-1

K4
4 6
8
K4
7

PE
M1

OPTO

M2
OPTO

CW
P1 MOTOR
SPEED ADJUST

X6-6 CLR
X6-7 BLK
X6-4 CLR
X6-1 BLK
X6-5 37
X6-2 36
X6-3 42
X10-3 59
X10-2 57
X10-5 58
43
X11-8 63
X11-9 65
X11-1 60
X11-2 61
X11-3 62
X11-4 64
X11-5 66
X12-3 62
X12-2 61
X12-1 60
X9-2 55
X9-3 54
X9-5 56
BLK
BLU
X7-2 X7-1

11 12

VERTICAL MOTOR

PHOTO
SENSOR
PCB2

FEEDER DEMAND/
EMERGENCY STOP
LS2

NOT
USED
LS4

AUTO
INDICATOR
(REF:S2)

NOT
USED

LOADER
LOW
SENSOR

PAPER
JAM
LS3

VERTICAL
CLUTCH
K1

DC
HORIZONTAL
MOTOR

HORIZONTAL
FEED
LS1

FOLDER AC/DC
438 SMART FEEDER/FOLDER

NOTE:
1) FOR SYSTEM #2 ONLY.
2) FOR SYSTEM #2 ONLY
   KX1 IS KX11, KX3 IS KX14.
3) FOR SYSTEM #4 ONLY.
4) FOR SYSTEM #'S 2, 3, 5 TO PRESENT.

FOLDER/ACCUMULATOR CONTROL
438 SMART FEEDER/FOLDER
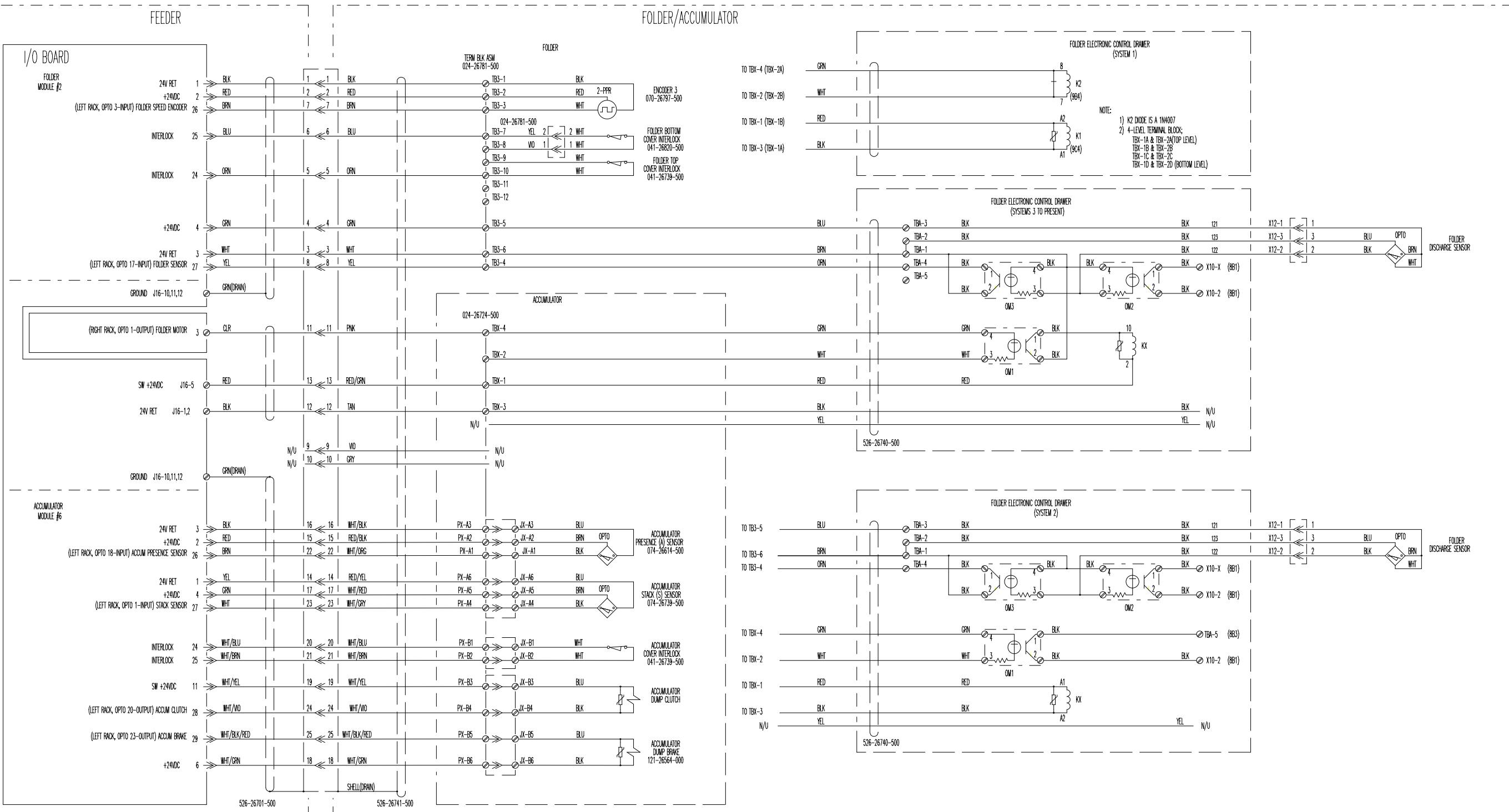
NOTE: 1) ALL WIRE IS 22 AWG UNLESS SPECIFIED OTHERWISE
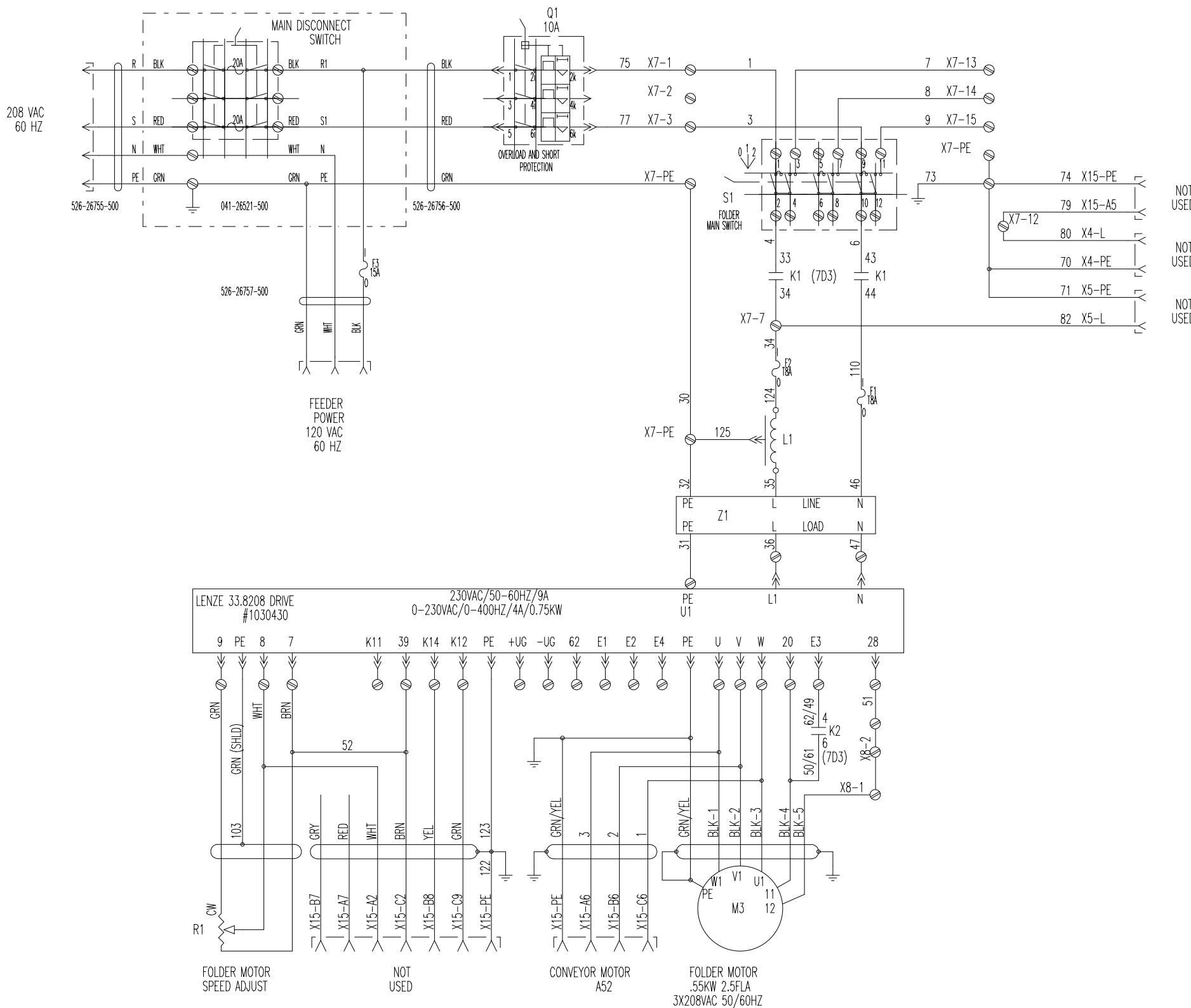
FOLDER AC/DC-SYSTEM #1
438 SMART FEEDER/FOLDER

PIGTAIL WIRE COLOR	DESCRIPTION OF CONNECTION	NOTES FOR INSERTERS WITH A.C. CONTROL ✶SEE NOTE 1	NOTES FOR INSERTERS WITH D.C. CONTROL

1 BLK
2 BRN
CONNECTION BETWEEN STATION 2 CONTROL SWITCH AND STATION 2 SOLENOID – BREAK CONNECTION — OTHER SIDE OF CONNECTION BROKEN ABOVE
CONNECT TO SWITCH
CONNECT TO SOLENOID
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID

3 RED
4 ORN
CONNECT THESE TWO WIRES IN SERIES WITH STATION 2 ERROR DETECT SWITCH
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL

5 YEL
6 GRN
CONNECTION BETWEEN STATION 3 CONTROL SWITCH AND STATION 3 SOLENOID – BREAK CONNECTION — OTHER SIDE OF CONNECTION BROKEN ABOVE
CONNECT TO SWITCH
CONNECT TO SOLENOID
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID

7 BLU
8 VIO
CONNECT THESE TWO WIRES IN SERIES WITH STATION 3 ERROR DETECT SWITCH
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL

9 GRY
WHT
CONNECTION BETWEEN STATION 4 CONTROL SWITCH AND STATION 4 SOLENOID – BREAK CONNECTION — OTHER SIDE OF CONNECTION BROKEN ABOVE
CONNECT TO SWITCH
CONNECT TO SOLENOID
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID

WHT/BLK
WHT/BRN
CONNECT THESE TWO WIRES IN SERIES WITH STATION 4 ERROR DETECT SWITCH
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL

WHT/RED
WHT/ORN
CONNECTION BETWEEN STATION 5 CONTROL SWITCH AND STATION 5 SOLENOID – BREAK CONNECTION — OTHER SIDE OF CONNECTION BROKEN ABOVE
CONNECT TO SWITCH
CONNECT TO SOLENOID
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID

WHT/YEL
WHT/GRN
CONNECT THESE TWO WIRES IN SERIES WITH STATION 5 ERROR DETECT SWITCH
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL

WHT/BLU
WHT/VIO
CONNECTION BETWEEN STATION 6 CONTROL SWITCH AND STATION 6 SOLENOID – BREAK CONNECTION — OTHER SIDE OF CONNECTION BROKEN ABOVE
CONNECT TO SWITCH
CONNECT TO SOLENOID
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID

WHT/GRY
WHT/BLK/BRN
CONNECT THESE TWO WIRES IN SERIES WITH STATION 6 ERROR DETECT SWITCH
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL

WHT/BLK/RED
CONNECT TO A POINT IN THE CIRCUIT THAT WILL GENERATE A MACHINE ERROR WHEN GROUNDED

TAN
PNK
CONNECTION BETWEEN MOISTENER CONTROL SWITCH AND MOISTENER SOLENOID – BREAK CONNECTION — OTHER SIDE OF CONNECTION BROKEN ABOVE
CONNECT TO SWITCH
CONNECT TO SOLENOID
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID

WHT/BLK/GRN
WHT/BLK/BLU
CONNECTION BETWEEN FLAP DETECT ERROR CIRCUIT AND GROUND – BREAK CONNECTION — OTHER SIDE OF CONNECTION BROKEN ABOVE – MUST BE CIRCUIT GROUND ✶SEE NOTE 2
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
MUST BE CIRCUIT GROUND

WHT/BLK/VIO
WHT/BLK/GRY
CONNECTION BETWEEN ENVELOPE CONTROL SWITCH AND ENVELOPE SOLENOID – BREAK CONNECTION — OTHER SIDE OF CONNECTION BROKEN ABOVE – MUST BE CIRCUIT GROUND
CONNECT TO SWITCH
CONNECT TO SOLENOID
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID

WHT/BLK/YEL
WHT/BLK/ORN
CONNECT THESE TWO WIRES ACROSS A POINT IN THE CIRCUIT THAT WILL PROVIDE VOLTAGE WHEN THE INSERTER IS RUNNING
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL

WHT/BLK/RED
RED/BLK
CONNECTION BETWEEN STATION 1 CONTROL SWITCH AND STATION 1 SOLENOID – BREAK CONNECTION — OTHER SIDE OF CONNECTION BROKEN ABOVE ✶SEE NOTE 3
CONNECT TO SWITCH
CONNECT TO SOLENOID
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL, PROBABLY SWITCH
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL, PROBABLY SOLENOID

RED/YEL
RED/GRN
CONNECT THESE TWO WIRES IN SERIES WITH STATION 1 ERROR DETECT SWITCH ✶SEE NOTE 3
CONNECT TO POINT WITH GREATEST POSITIVE POTENTIAL
CONNECT TO POINT WITH GREATEST NEGATIVE POTENTIAL

WHT/BLK/BLK
NO CONNECTION

WHT/RED/RED — 1
WHT/RED/BLK — 3
WHT/RED/GRN — 2

✶ NOTE 1 – GENERAL NOTE FOR INSERTERS WITH A.C. CONTROL – CONTROL VOLTAGES MUST BE 12–280VAC.

✶ NOTE 2 – ASSUMES THAT FLAP DETECT CIRCUIT CONNECTS TO CIRCUIT GROUND TO CREATE AN ERROR.

✶ NOTE 3 – ONLY MAKE STATION 1 CONNECTIONS IF 420/PF300 IS NOT LOCATED AT STATION 1, I.E. OPEN ENDED.

002C-07968
AC/DC CONTROL CABLE

NOTE: THIS SHEET IS INSTALLATION INSTRUCTIONS

SECTION G – INTERFACE WITH OPTIONAL EQUIPMENT

The 438 is designed to be run on-line with the inserter. It can be docked to any of the insert stations, however, station #1 is preferable. Before the 438 may be mated up to the inserter there are a few pieces on the inserter which need to be removed or repositioned. The parts to be removed are the hopper side and rear plates, T-plate, and insert cushion cup. The singulator finger and cushion cup mount must be repositioned. A demand switch must be added to the transfer conveyor.

These changes may be done once and left that way so the 438 may be used again without going through them each time. If this is done however, this station will not be usable in normal operation.

G.1   REMOVAL OF HOPPER SIDE PLATES

NOTE: View of Insert Hopper is from 438 side of inserter.

1. Remove four screws holding side plate adjustment shaft blocks.

2. Remove shaft E-clips.

3. Unlock right side plate and slide off end of shaft.

4. Slide left side plate out to end of shaht (near adjustment knob). The shaft and side plate now may be removed (you may find it necessary to turn the plate and shaft to free it from the inserter).

G.2   REMOVE HOPPER GUIDE

1. Remove cover directly behind insert station.

2. Unlock mount, remove outer snap rings.

3. Slide shaft to right, the left side mounting bracket will drop down under inserter deck.

4. Slide shaft to left, the right slide bracket will drop.

5. Remove rear plate. Remove two Phillips head screws holding T-plate in place, remove T-plate.

Left side Guide plate

Right side Guide plate

Remove 4 screws

2 snap rings

Suction cup

Insert T plate Figure
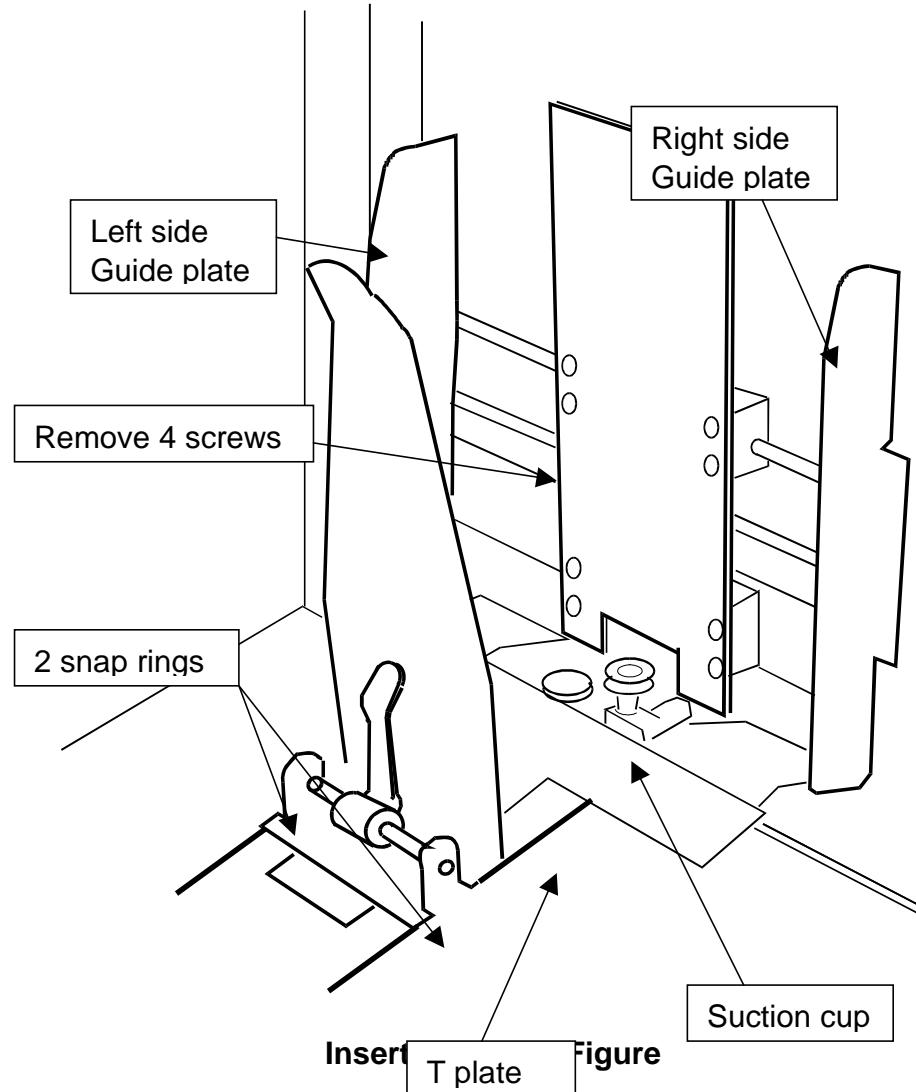
G.3 REMOVE SINGULATOR FINGER

NOTE: View of Sing. Finger is from opposite side of inserter.

1. Cycle the inserter so that the gripper arm is at its furthest point from hopper area.

2. Loosen singulator finger, then rotate it away from hopper and to right.

3. Remove suction cup. Loosen the cup mount and swing it down away from the hopper area. Do not tighten yet.

4. Jog the inserter slowly through one cycle, observing mount closely. You will notice that as the mount swings downward it will bottom against the shaft behind it. If it does not, swing mount further down and cycle the inserter again.
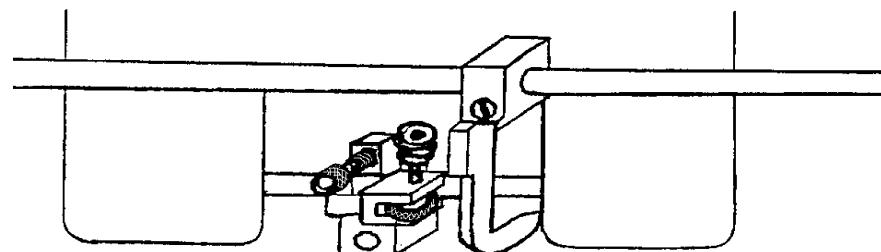
Singulator Finger Figure

G.4 438 INTERFACE COUPLING

The machine is designed to permit the operator to connect the 438 directly to the inserting device. The output is conveyed to the inserting device by an articulated conveyor arm. The arm places the document directly in position for the inserter's gripper arm to pull the document out of the conveying arm and place it directly onto the track of the inserter.
Orientation: As viewed from operator area of inserter.

1. Gain access to shafts located under cover to the right of station 1, at table height.
2. Jog inserter so gripper arms are moving towards insert stations: stop when vertical.
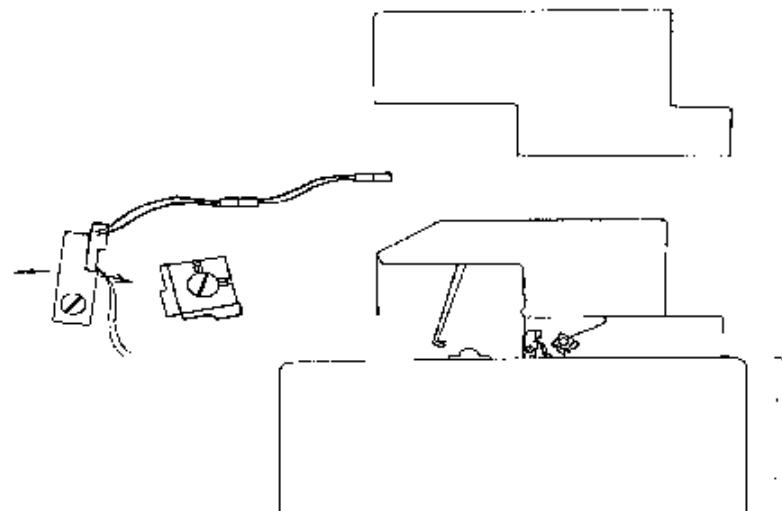
Gripper Arms Orientation to 438 Figure

3. Install switch block on small shaft, with the switch to the top, rear. Looking end on, block should have 5 degree tilt towards other shaft. If shaft is not long enough use universal bracket, on outer frame cover, or deck.
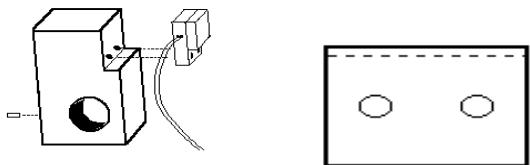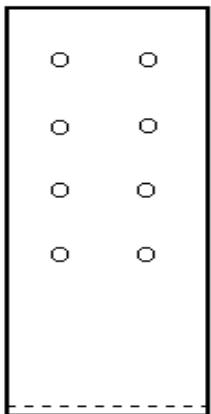
Switch Block and Bracket Figure

4. Install double magnet block on large shaft. NOTE: Do not tighten yet: snug one screw.

5. Turn on the 438, press "Test" and then "I/O 144 Board" (refer to Section C.1 for the demand switch input location).
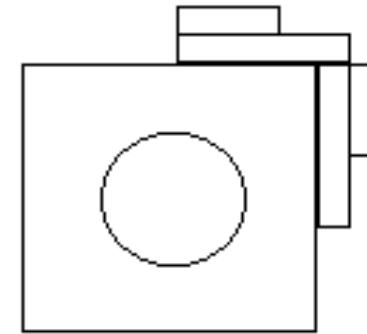
Magnetic Block Figure

6. You are now in the input/output test section. Connect demand switch to the provided cable from the 438 output conveyor.

7. Jog inserter to rotate magnet block assembly. Desired timing is when the demand input (438 display) goes on when the grip arm is one insert from output conveyor while moving away, adjust position of magnet block to accomplish this. When satisfied with the timing, tighten all set screws.

G.5   BUHRS INSERTER INTERFACE OPTION

This option kit provides a signal that synchronizes the 438 with Buhrs Inserter. See Parts Section for a view of this assembly with part numbers.

SECTION H - MISCELLANEOUS

H.1   Service Bulletins

Technical Bulletins for your machine regarding software updates, product updates, and safety issues will be sent to you whenever necessary.

H.2   Purchased Components Manuals

Model 30 Hardware Operations Manual

The Accu-Sort® Model 30 Scanner is used to read bar code. 438 machines with bar code capabilities are shipped with the Model 30 Scanner manual from Accu-Sort® Systems, Inc. 511 School House Road, Telford, PA 18969

H.3   Engineering Values

Number **(Prior Rev.)** **(26412.028)**

Number	Prior Rev.	26412.028	
01	20	20	**Acc Feed Settle Time**

- Time(msec) after trail edge of last page passes Accumulator stack sensor into Accumulator until Accumulator clutch is fired.

02	70→10	70→10	**Acc Dump Done Time**

- Advance Feed ON: Time(msec) from "Accumulator is going to dump" until next feed is started. A short value advance feeds, before the pack moves from the Accumulator. A longer time allows pack movement detected at the Accumulator presence sensor to start the next pack feed. Higher is safer, lower is faster, but assumes pack leaves Accumulator.
- Advance Feed OFF: Time(msec) from pack movement at the detected at the Accumulator presence sensor to start the next pack feed.

03	60	60	**Bar Read Time**

- Time(msec) waiting for reader response.

04	300	250	**Folder Exit Time**

- Time(msec) allowed for pack to reach the folder exit sensor.

05	150	150	**Line Read Time**

- Time(msec) waiting for reader response.

06	10	10	**Xcvy Dump To Acc Dump Time**

- Time(msec) from "Xcvy is going to move" until next Accum dump is started.

07	105	100	**Xcvy Clutch On Time**

- Time(msec) Xcvy clutch is on adjusted for number of stations. Adjust up/down to place the last pack at the Xcvy exit.

08	225	200	**Xcvy Into Station 1 Time**
09	60	50	**Xcvy Outof Station 1 Time**
10	350	400	**Folder Start To Conveyor Time**

- Should be greater than Eng Value 04, Folder Exit Time when Exit Type is Conveyor and not in test.

11   0   0   **Test Console Switch**

- 0 = turns off diagnostics only used in debug mode.

12   1   1   **Language Select**

- 1 = English.

13   8   8   **Xcvy Package InOut Counter**

- Max Number of packages expected in Xcvy. 0 disables this check.

14   150   150   **Acc Dump Clutch On Time**

- Constant value Accumulator clutch is on adjusted for speed. Adjust up so pack fully exits. Adjust down if next pack is partially pulled under rollers.

15   5   5   **TouchScreen X Correction**

- Constant value for touch sensing. Adjust up to move sense right. Adjust down to move sense left.

16   -10   -10   **TouchScreen Y Correction**

- Constant value for touch sensing. Adjust down to move sense up. Adjust up to move sense down.

17   20000   20000   **Paper Demand Time**

- Time(msec) waiting for paper stack switch in feeder to be satisfied by infeed.

18   4   4   **Max Xcvy Stations**

- Max Number of package positions in Xcvy.

19   0   0   **Test ExitComm Test List Switch**

- 0 = No extra ExitComm (Comm3) list messages.
- 1 = Extra ExitComm list messages, times in msec, Demand time, receive character (for Sure-Feed).

20   1   1   **Exit Demand Switch**

- Applies to HopperFill and Conveyor.
- 0 = No Exit Demand required.
- 1 = Exit Demand required(for Conveyor for Sure-Feed).

21   200   215   **Exit Demand Time Out**

			• Default 60 = 60 seconds to shut down on no demand. Range 0 to 999 seconds.
22	3000	3000	**Xcvy Jam At Out Time**
			• Default 3000 = 3000 msec to pass pack through exit sensor. Range 0 to 9000 msec.
23	250	250	**Xcvy Jam At In Time**
			• Default 500 = 500 msec to pass from folder to in sensor. Range 0 to 9000 msec.
24	170→200	170→200	**Feed to Accum Time**
			• Default 170 = 170 msec for the lead edge of paper fed at the feed sensor to the lead edge entering the accumulator. Range 0 to 5000 msec.
25	1	1	**Advance Feed Switch**
			• 1=ON, allows the next pack to be started when the Accumulator is supposed to dump plus the Accumulator Dump Time.
			• 0=OFF, starts the next pack after Accumulator Presence Sensor is cleared plus the Accumulator Dump Time.
26	0	0	**Comm Hardware Type**
			• 0 = Ziatech, 1 = WinSystems.
27	4444	4444	**Eng Values Password**
			• 4444 = Default(9561 is backup).
28	1	1	**Eng Values Enable Password**
			• 1 = Enable(Default), 0 = Disable. This enables or disables password to access Engineering Values.
29	3	3	**Max. Exit Demand Power On Cycles**
			• 3 = Default. Number of inserter demand cycles before 438 outputs a package.
30	n/a	2	**Bar Read Commport (cycle machine power after changing setting)**
			• 1=CPU
			• 2=Serial

H.4   Typical Postal Metering Setup Presets

The following are 'Typical Presets' for the 438 configured for 6-Station AC/DC Open Feed Inserter Control with two postal meters, Meter 2 and Meter 3, Meter 1 and Meter 2. This may vary from your actual application.

Test - "Setup"

Double Detect	ON
Presets Reset	NA
Lower Left Display	OMR
Lower Right Display	OMR
No Use Timeout	OFF
Pulse Feed	ON
Type of Transfer	OPEN FEED
Beep/Bell	ON
Input Conveyor	2000 Sheet Conveyor
High Count Stop	07
Performance	Off
Inserter Online/Offline	Online
First Page Hold delay	30
Config ID	Xfer Conveyor(W/Inserter)
Dump to Feed Delay Setup	05
Dump Delay Timer Setup	25

Test - "Inserter"

Insert Vacuum Enable	On at:100
Envelope Hopper Vacuum	On at:230
	Insert Sta.-:2

Envelope Flap Detect	On at:010
	Off at:350
	Insert Sta.-:1
Ink Marking	On at:010
	Off at:010
	Insert Sta.:00
Postal Meter Divert	On at:200 (First Meter inline when Meters 1 and 2 tested)
	Off at:010
	Insert Sta.:07
Logical Shift	Enable at:090
Bad Package Stop	Enable at:080
Number of Insert Stations	6
Number of Empty Stations	2
Encoder Type	GBR 100 Tick Encoder
Opto Logic Type	AC/DC Dumb Inserter
Postal Meter 2	On at:200(for first Meter inline, 240 if second meter inline)
	Off at:010
	Insert Sta.:07
	Pt:1
Postal Meter 3	On at:200(for first Meter inline, 240 if second meter inline)
	Off at:010
	Insert Sta.:07
	Pt:2
Postal Meter Weights	Meter 1 to 2: 00004 Meter 2 to 3: 00005

Weight Page and Envelope Page: 00001   Envelope:
                                       00001 >: 00001 >: 00001 >:
                                       00001
Weight Inserts 1 2 3 4 >: 00001 >: 00001 >: 00001 >:
                                       00001
Weight Inserts 5 6 7 8 >: 00001 >: 00001 >: 00001 >:
                                       00001

Read - "GBR Line"

Demand Feed	Normal
Page sequence	Item Count
Group Sequence	Off
Ink Mark	Off
Postal Meter Divert	Off(Off = NO divert by mark and YES Meter 1 Weight)
Parity	None
End of Subset	Off
Random Check Mark	Off
Blank Page Error Stop	On
Number of Windows	1
Window Setup	1: Begin:07 Length:16
Lines Per Inch	6
Probe A or B	A
Bit Weight	LSB First
Calibration	Off
Tolerance	Low
Code Field Format	
EOG	EOG:00 NOT EOG:00
Page	Begin:5 Length:3 Min:1 Max:7
Group	Begin:2 Length:3 Min:1 Max:4
Inserts	Begin:10 Length:6 Max:6
Postal Meter Divert	At Line:0
Subset	At Line:0 By Count Size:0
Parity	At Line:0
Random Check Mark	At Line:0 Repeat Every:0

Read - "Bar"

Job Setup   Job 41

Stop for Read Errors   Yes

'READ(LINEREAD)' to 'SETUP' Menu:

Postal Meter Divert Enable(Postal Meter 1).

 (May operate from a read mark as before. Consult the 420 Operating Manual)

- Select Postal Meter Divert Enable "ON", to operate from a Lineread mark.
- Select Postal Meter Divert Enable "OFF", to operate from Weights.

'TEST' to 'INSERTER' to 'TIMING' Menu:

Postal Meter Divert(Postal Meter 1)

- Enter Meter "ON AT:' in degrees, 0 to 350.
- Enter Meter "OFF AT:' in degrees, 0 to 350.
- Enter Meter Position 'STA:' (1 to 12 after envelope insert station)

Postal Meter 2

- Enter Meter "ON AT:' in degrees, 0 to 350.
- Enter Meter "OFF AT:' in degrees, 0 to 350. Not Used
- Enter Meter Position 'STA:' (1 to 12 after envelope insert station)
- Enter Meter Output Point Option 'PT:'

- 1 = Station 7 Select - Default
- 2 = Station 8 Select
- 3 = Inserter E-Stop
- 4 = Station 1 Error
- 5 = Station 7 Select - Inverted Signal
- 6 = Station 8 Select - Inverted Signal
- 7 = Inserter E-Stop - Inverted Signal
- 8 = Station 1 Error - Inverted Signal

Postal Meter 3

- Enter Meter "ON AT:' in degrees, 0 to 350.
- Enter Meter "OFF AT:' in degrees, 0 to 350. Not Used
- Enter Meter Position 'STA:' (1 to 12 after envelope insert station)
- Enter Meter Output Point Option 'PT:'
  - 1 = Station 7 Select
  - 2 = Station 8 Select - Default
  - 3 = Inserter E-Stop
  - 4 = Station 1 Error
  - 5 = Station 7 Select - Inverted Signal
  - 6 = Station 8 Select - Inverted Signal
  - 7 = Inserter E-Stop - Inverted Signal
  - 8 = Station 1 Error - Inverted Signal

Postal Meter Weights

- Meter 1 to 2 Weight Value(00000 to 60000)
- Meter 2 to 3 Weight Value(00000 to 60000)

Weight Page and Envelope

- Enter Page Weight Value(00000 to 60000)
- Enter Envelope Weight Value(00000 to 60000)

Weight Inserts 1 2 3 4

- Enter Insert >1 Weight Value(00000 to 60000)
- Enter Insert >2 Weight Value(00000 to 60000)
- Enter Insert >3 Weight Value(00000 to 60000)
- Enter Insert >4 Weight Value(00000 to 60000)

Weight Inserts 5 6 7 8

- Enter Insert >5 Weight Value(00000 to 60000)
- Enter Insert >6 Weight Value(00000 to 60000)
- Enter Insert >7 Weight Value(00000 to 60000)
- Enter Insert >8 Weight Value(00000 to 60000)

Operation
- Package Weight less or equal(<=) to Meter 1 to 2 Weight Value
  - Meter 1 operates.
- Package Weight greater than Meter 1 to 2 Weight Value and less or equal(<=) to Meter 2 to 3 Weight Value
  - Meter 2 operates.
- Package Weight greater than Meter 2 to 3 Weight Value

Meter 3 operates.

Notes:

SECTION I – PARTS

738-26206-500, 438 TOP ASSEMBLY

CONVEYOR, OPTIONAL

③ THIS SIDE
④ OTHER SIDE

738-26206-500, 438 TOP ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	005-27522-500	CABINET ASSEMBLY
2	549-26603-500	FEEDER ASSEMBLY
3	579-26329-600	LEFT FEEDER COVER
4	579-26341-600	RIGHT FEEDER COVER
5	702-26612-500	ACCUMULATOR
6	703-26611-500	FOLDER
7	041-26521-504	DISCONNECT SWITCH
8	709-26907-500	TOUCHSCREEN

005-27522-500, CABINET ASSEMBLY
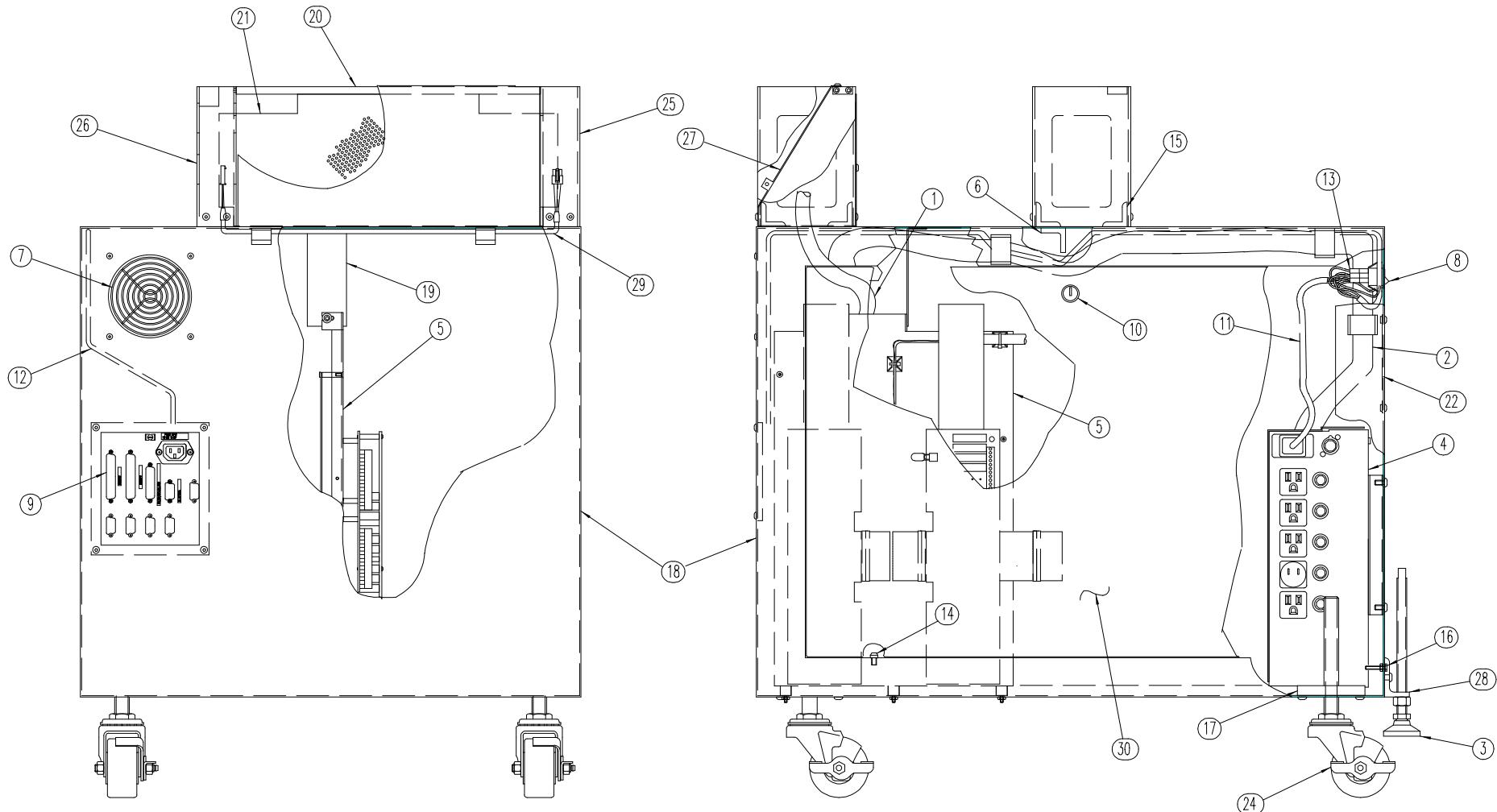
005-27522-500, CABINET ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002B-07742	CABLE,FEEDER I/O
2	002B-08511	CABLE,I/O,AC BOX
3	002B-19707	LEVELING MOUNT
4	002D-08135	POWER UNIT,A/C BOX
5	580-27508-500	CONTROL PANEL
6	020-26565-600	CABINET SUPPORT
7	027-4C551	FINGER GUARD
8	041-4LTGU0511TR	SWITCH
9	091-26702-500	ADAPTOR PLATE
10	172-CR7300	LOCK WITH KEY
11	526-26700-501	CABLE,ON/OFF POWER SWITCH
12	526-26700-502	CABLE,ON/OFF POWER SWITCH
13	526-26700-503	CABLE,ON/OFF POWER SWITCH
14	600A-13967	LOCATING PIN
15	600A-17632	TUNNEL ANCHOR
16	600A-17921	GROUND SCREW
17	600A-18996	LEVELER SUPPORT BLOCK
18	005-27147-600	CABINET
19	600B-19433	PANEL ANGLE
20	600B-19961	MIDDLE TIE BAR
21	600B-21843	MESH SCREEN
22	600B-22478	INFEED PLATE
23	XXXX	XXXX
24	600C-19041	SWIVEL CASTER
25	600C-19439	SUPPORT TOWER
26	600C-19439	SUPPORT TOWER
27	600C-21842	FRONT COVER
28	600C-22436	JACK SUPPORT
29	526-26846-500	CABLE,DOUBLE-DETECT EXT
30	600D-22366	CABINET PANEL

580-27508-500, CONTROL PANEL ASSEMBLY
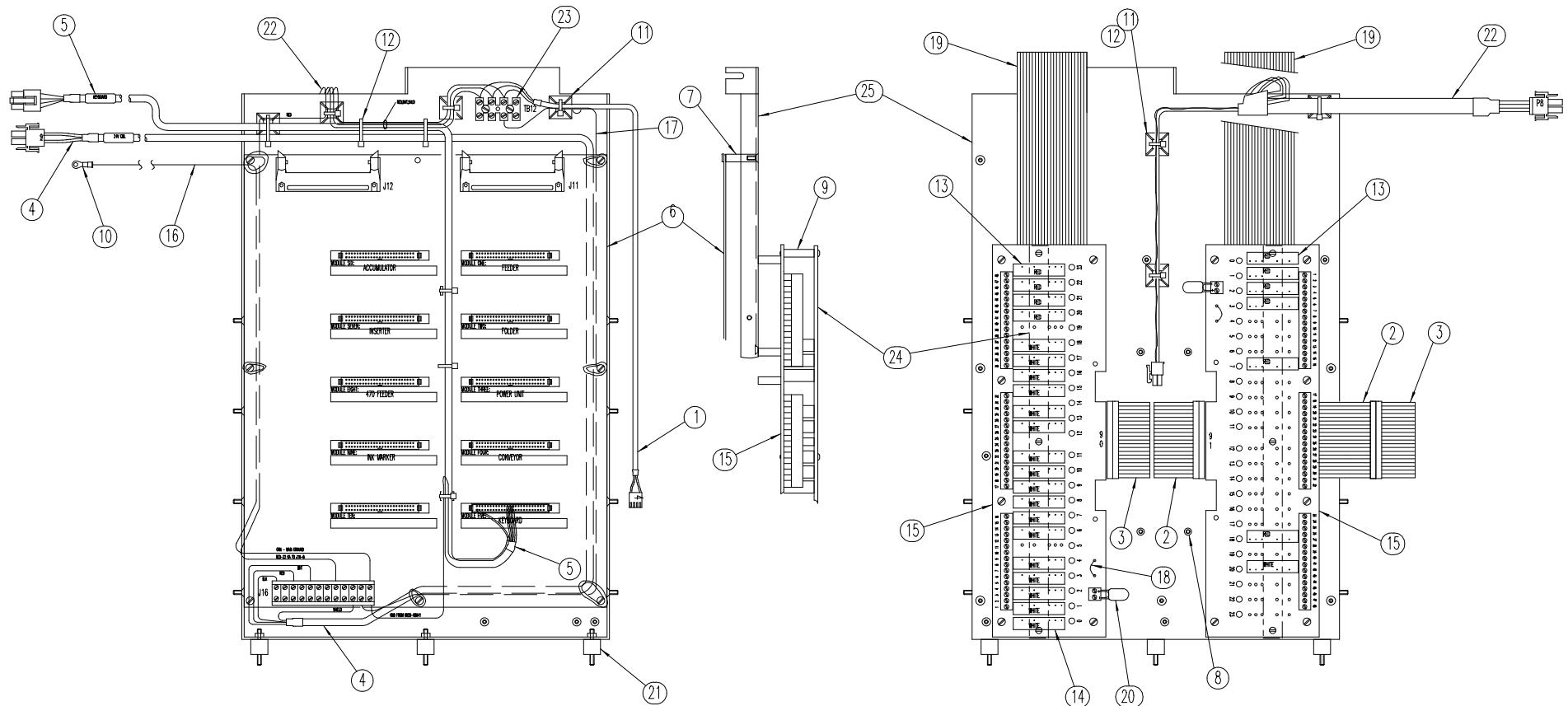
580-27508-500, CONTROL PANEL ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002B-08523	READER 5V CABLE
2	002B-08524	CABLE 91 ASSEMBLY
3	002B-08525	CABLE 90 ASSEMBLY
4	002B-08537	P9 CABLE ASSEMBLY
5	002B-08541	KEYBOARD CABLE
6	002D-08138	INTERCONNECT BOARD
7	020-RN00620416	STANDOFF,ROUND,1"LONG
8	020-RN00620425	STANDOFF,ROUND,#6-32 X 1.56
9	020-RN00820416	STANDOFF,ROUND,1"LONG
10	025-A218VN	RING,LUG,#8
11	026-ABMMA	TY-WRAP ANCHOR
12	026-PLM1M	TY-WRAP
13	030-SMODC5	MODULE (RED)
14	030-SMIDC5	MODULE (WHITE)
15	042-PB24SM	I/O BOARD,PB24-SM
16	045-018135	WIRE,18 AWG,GREEN
17	045-222135	WIRE,22 AWG,GREEN
18	045-22202A	WIRE,22 AWG,BUSS
19	046-4285011B	CABLE,RIBBON,28GA,50 COND
20	051-0476350	CAPACITOR,47uf,35V
21	173-VBM1062	RUBBER MOUNT
22	526-27509-500	P8 CABLE
23	600A-17923	TERMINAL BLOCK
24	600B-22454	OPTO RACK BAR
25	600D-19050	PANEL

002D-08135, POWER UNIT A/C BOX
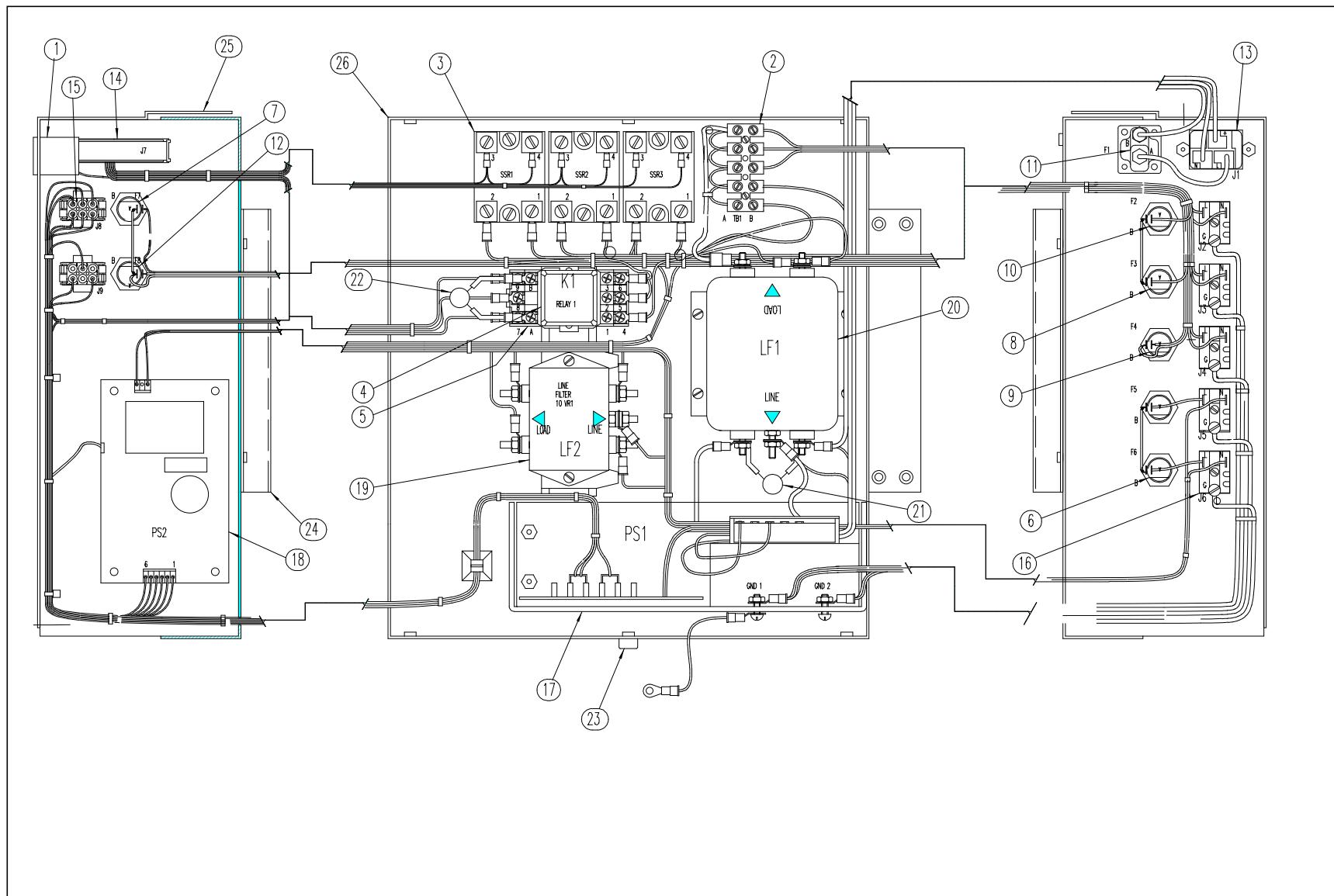
002D-08135, POWER UNIT A/C BOX

INDEX	PART NUMBER	DESCRIPTION
1	002B-08521	METER ASSEMBLY
2	024-213406253	TERMINAL STRIP
3	030-1240D25	SOLID STATE RELAY
4	030-2KUMP14D182	RELAY,SPDT,24VDC
5	031-24200	SOCKET,RELAY,11 PIN
6	032-00005250	FUSE,1/2 AMP
7	032-00015250	FUSE,1 ½ AMP
8	032-00030250	FUSE,3 AMP
9	032-00040250	FUSE,4 AMP
10	032-01120250	FUSE,12 AMP
11	032-00150250	FUSE,15 AMP
12	032-10020250	FUSE,2 AMP
13	035-H320B	POWER INLET
14	037-60950SM1	SOCKET CONNECTOR
15	039-67293001	CONNECTOR
16	039-88010641	RECEPTACLE
17	044-ECV24N48	POWER SUPPLY
18	044-VL30341011	POWER SUPPLY
19	050-24206	LINE FILTER,10 AMP
20	050-20R6	EMI FILTER,20 AMP
21	067-V130LAZOA	VARISTOR
22	067-V33ZA5	VARISTOR
23	173-2192	BUMPER
24	600B-17246	BRACKET
25	600D-17897	COVER
26	600D-19051	PANEL ENCLOSURE

091-26702-500, ADAPTOR PLATE ASSEMBLY

FRONT VIEW

BACK VIEW
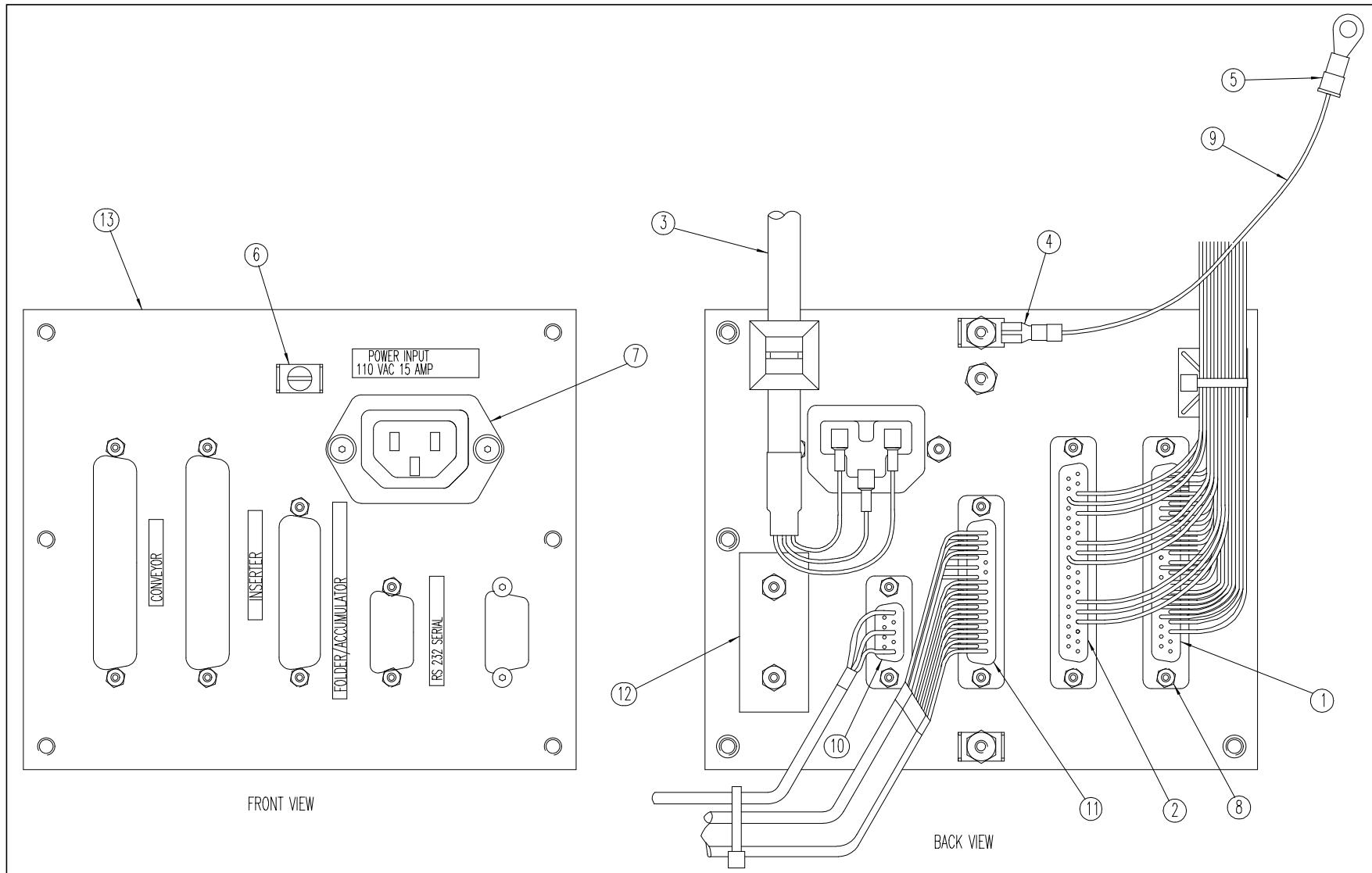
091-26702-500, ADAPTOR PLATE ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002B-07723	CABLE,CONVEYOR I/O MOD 4
2	002B-07724	CABLE,MOD 7
3	526-26700-500	CABLE,POWER SWITCH
4	025-43125VN	FEMALE Q-D,1/4"
5	025-B398VN	RING CRIMP,#8
6	025-MT523	MALE CONNECTOR,DUAL Q-D
7	035-8301213	POWER INLET
8	039-2058173	FEMALE SCREW LOCK
9	045-13165	WIRE,GREEN,16 GA
10	526-27525-500	CABLE,RS 232 SERIAL
11	526-26701-500	CABLE,ACCUMULATOR/FOLDER
12	600B-19109-001	BLANK CONN PLATE (PLUG)
13	091-26673-600	ADAPTOR PLATE

549-26603-500, FEEDER ASSEMBLY, page 1
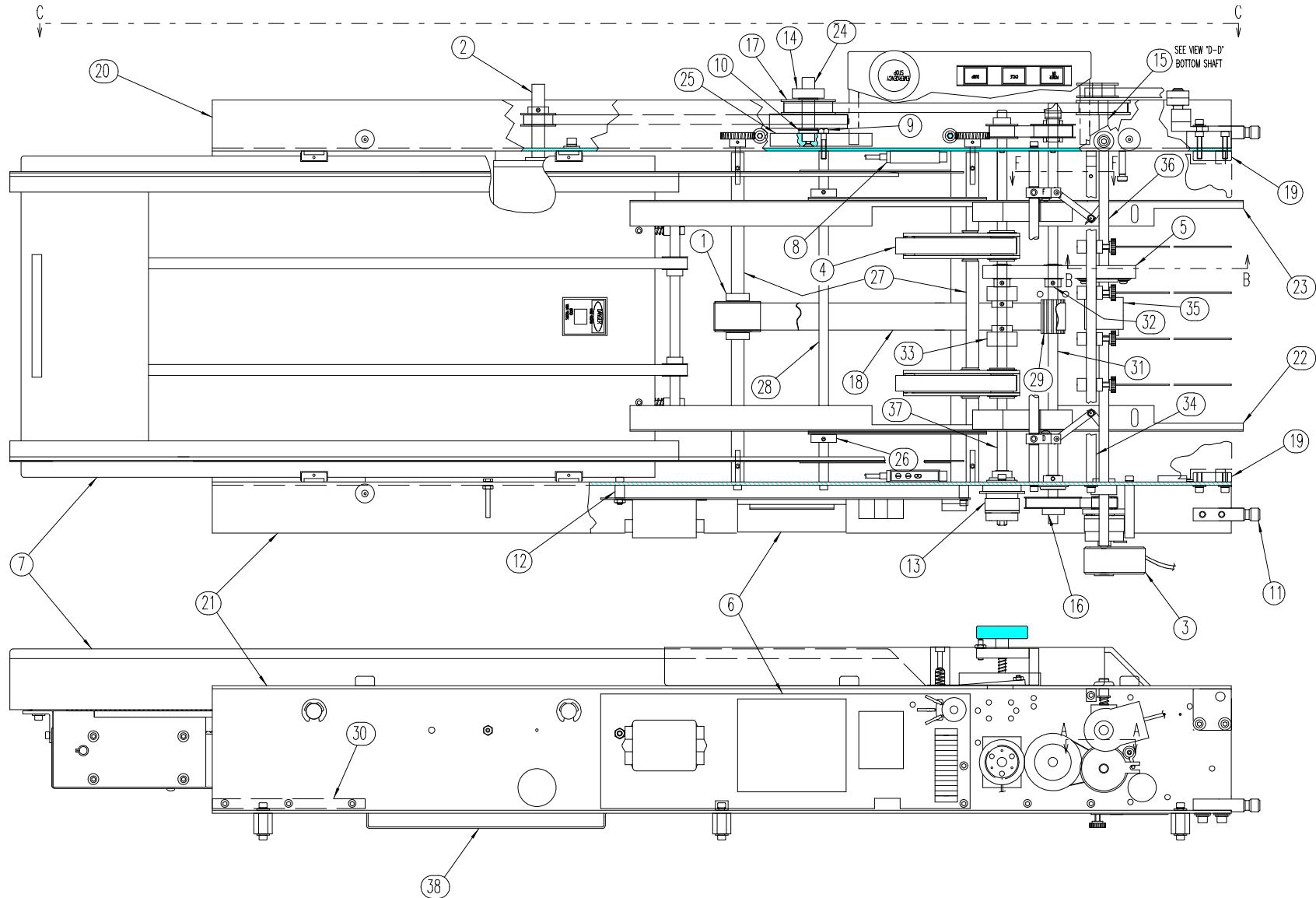
549-26603-500, FEEDER ASSEMBLY, page 1

INDEX	PART NUMBER	DESCRIPTION
1	002A-22091	PULLEY
2	002B-08526	FEEDER MOTOR
3	002B-08630	ENCODER
4	002B-21905	OUTSIDE FEED BELTS
5	600B-15839-003	MIDDLE TIE PLATE
	025-25947-500	STATIC BRAID
	002B-19633	BEARING BLOCK
	002A-08462	GROUND WIRE
6	002D-08522	FEEDER ELECTRICAL ASSEMBLY
7	002D-17505	CREEPER CONVEYOR ASM
8	002B-08570	SENSOR MODULE
9	014-10262216	HEX HEAD BOLT,#10-32 X 1"
10	016-S0500075012	SHIM,.5ID,.75OD,.12THK
	016-S05000750010	SHIM,.5ID,.75OD,.010THK
11	018-26512-600	DOCKING PIN
12	020-RA010C0608	SPACER,#10C,.5LG
13	002B-08157	BRAKE
14	123-8AL	COLLAR
15	095-25212-600	SHAFT,CLUTCH HARDENED
16	112-200DBA30637	PULLEY,TIMING,30T
17	112-26300-500	PULLEY ASSEMBLY
18	113-S290XL100	BELT,TIMING,TAN
19	320-26217-600	DOOR MOUNT BLOCK
20	547-25937-500	LEFT FEEDER CHASSIS
21	547-27279-500	RIGHT FEEDER CHASSIS
22	592-26208-600	RIGHT PAPER GUIDE RAIL
23	592-26209-600	LEFT PAPER GUIDE RAIL
24	600A-17661	SHAFT,DRIVE PULLEY
25	600A-21521	PULLEY MOUNTING BLOCK
26	600B-15839-014	HANGER GUIDE RAIL
27	600B-15839-017	TENSIONER SHAFT
28	600B-15839-028	TIE BAR RAIL GUIDE
29	600B-15839-060	PULLEY,FEED DRIVE
30	600B-15839-125	TIE PLATE
31	600B-16122-033	HOPPER FEED SHAFT
32	600B-16404-005	HUB,ROLLER BEARING
33	600B-16430	DRIVE ROLLER
34	600B-17312	FEEDER MOUNT BAR
35	600B-17541	PULLOUT ROLLER
36	600B-17848	UPPER PULLOUT SHAFT
37	095-27252-500	SHAFT,SINGULATOR DRIVE
38	600D-22275	FEEDER TRAY

549-26603-500, FEEDER ASSEMBLY, page 2

VIEW 'C – C'

VIEW 'A – A'

VIEW 'D – D'

VIEW 'B – B'

VIEW 'F – F'

549-26603-500, FEEDER ASSEMBLY, page 2

INDEX	PART NUMBER	DESCRIPTION
1	002A-16437	PULLEY
2	002A-16457-005	THUMBSCREW,#8-32,.5LG
3	144-27060-500	UPPER PAPER GUIDE
4	002A-20917	LOWER PAPER GUIDE
5	002B-08526	FEEDER MOTOR
6	002D-16435	SINGULATOR ASSEMBLY
7	002D-18099	SINGULATOR COVER ASM
8	007-26214-600	BRACKET HANGER
9	008-1131BK4	PLASTIC KNOB
10	016-26219-600	CLIP, SENSOR MOUNT
11	020-HA01021013	STANDOFF,#10-32,.812LG
12	057-26856-500	DOUBLE DETECT & FEED SENSOR
13	095-25212-600	SHAFT,CLUTCH HARDENED
14	104-1M5N24	WORM GEAR
15	110-26576-600	TENSIONER BAR
16	112-200DBA16637	PULLEY,TIMING,16T
17	112-200DBA18650	PULLEY,TIMING,18T
18	112-200DBA30637	PULLEY,TIMING,30T
19	112-200DOA30637	PULLEY,TIMING,30T
20	112-26300-500	PULLEY ASSEMBLY
21	112-26311-600	PULLEY MOD
22	113-20008003712	BELT,TIMING,40G
23	113-200090037	BELT,TIMING,45G
24	113-200190037	BELT,TIMING
25	113-200290037	BELT,TIMING
26	126-SSC25	COLLAR
27	152-B683	BEARING
28	153-FB6103	FLANGE BEARING
29	167-125375	WOODRUFF KEY
30	186-492813591	EXTENDED TENSIONER ASM
31	320-26332-600	MOUNT BLOCK
32	547-25937-500	LEFT FEEDER CHASSIS
33	580-26544-500	KEYBOARD ASSEMBLY
34	592-26210-600	LEFT GUIDE SHOE
	592-26211-600	RIGHT GUIDE SHOE
35	600A-16556	WORM GEAR ASM
36	600A-18200	CLUTCH STOP
37	600B-17312	FEEDER MOUNT BAR
38	600B-17666	TENSION ADJUST
39	600B-22223	ADAPTOR PLATE
40	122-27256-500	FRICTION CLUTCH

547-25937-500, LEFT SIDE CHASSIS ASSEMBLY

547-25937-500, LEFT SIDE CHASSIS ASSEMBLY
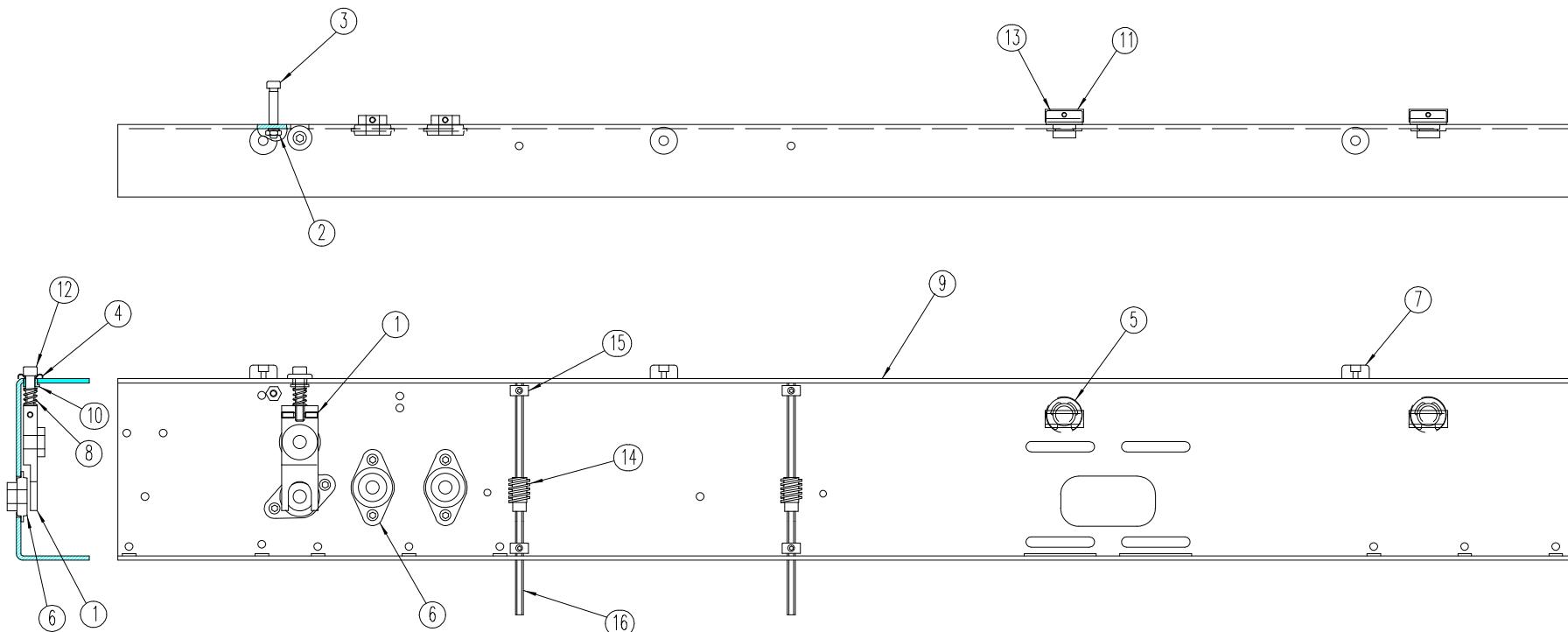
INDEX	PART NUMBER	DESCRIPTION
1	002A-17929	BEARING BLOCK
2	013-0104	HEX NUT,#10-24
3	014-025031116	SHOULDER BOLT
4	016-712	CUP WASHER
5	019-100062	"E" RING
6	158-S3PPB5ST	RADIAL BEARING
7	173-2194	BUMPER
8	181-3600401000	SPRING
9	547-25934-600	LEFT FRAME
10	600A-15839-012	GUIDE BUSHING
11	600A-15839-119	TRACK BUTTON INSERT
12	600A-15915-025	ADJUSTMENT SCREW
13	600B-15839-068	TRACK BUTTON
14	104-1M5N24	WORM
15	126-SSC25	COLLAR,.25 DIA
16	600B-17666	TENSION ADJUST

547-27279-500, RIGHT SIDE CHASSIS ASSEMBLY
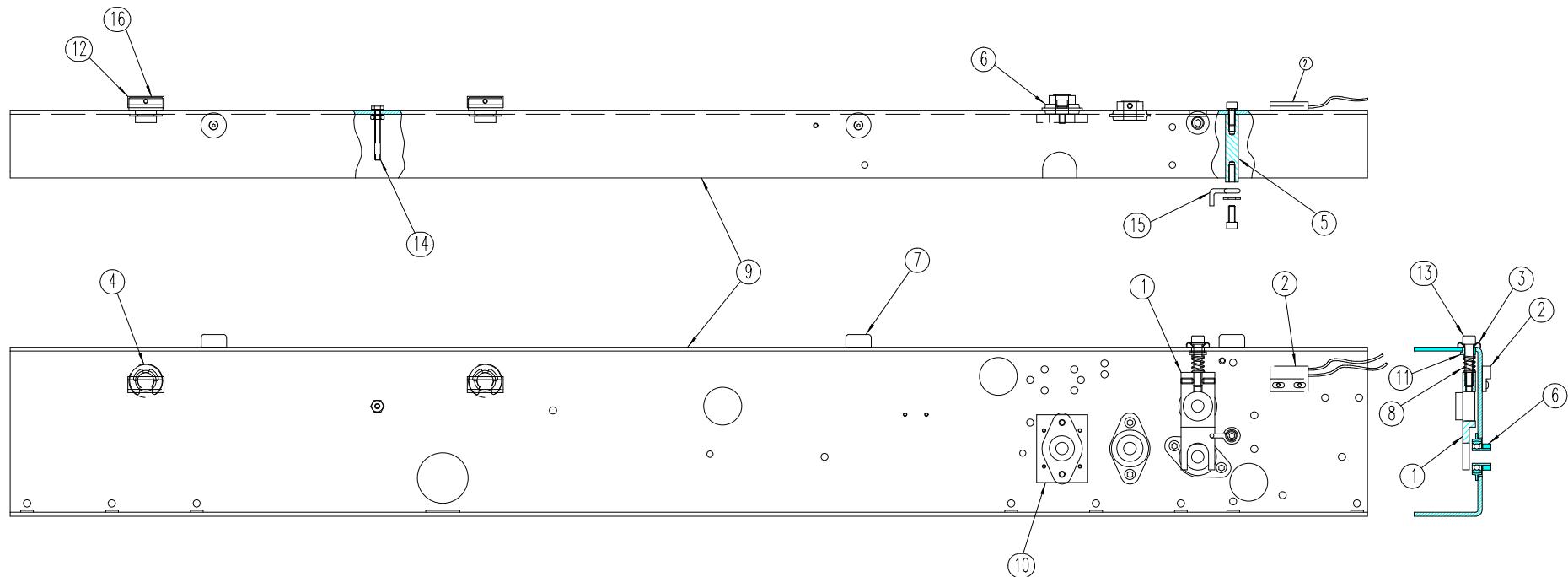
547-27279-500, RIGHT SIDE CHASSIS ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002A-17929	BEARING BLOCK
2	002B-08569	INTERLOCK ASSEMBLY
3	016-712	CUP WASHER
4	019-100062	"E" RING
5	020-RA01020632	STANDOFF,#10-32 X 2"
6	158-S3PPB5ST	RADIAL BEARING
7	173-2194	BUMPER
8	181-3600401000	SPRING
9	547-25935-600	RIGHT FRAME
10	584-27253-600	ADAPTOR PLATE
11	600A-15839-012	GUIDE BUSHING
12	600A-15839-119	TRACK BUTTON INSERT
13	600A-15915-025	ADJUSTMENT SCREW
14	600A-17921	GROUND SCREW
15	600A-18200	CLUTCH STOP
16	600B-15839-068	TRACK BUTTON

002D-16435, SINGULATOR ASSEMBLY

LOWER   RAISE

A

A

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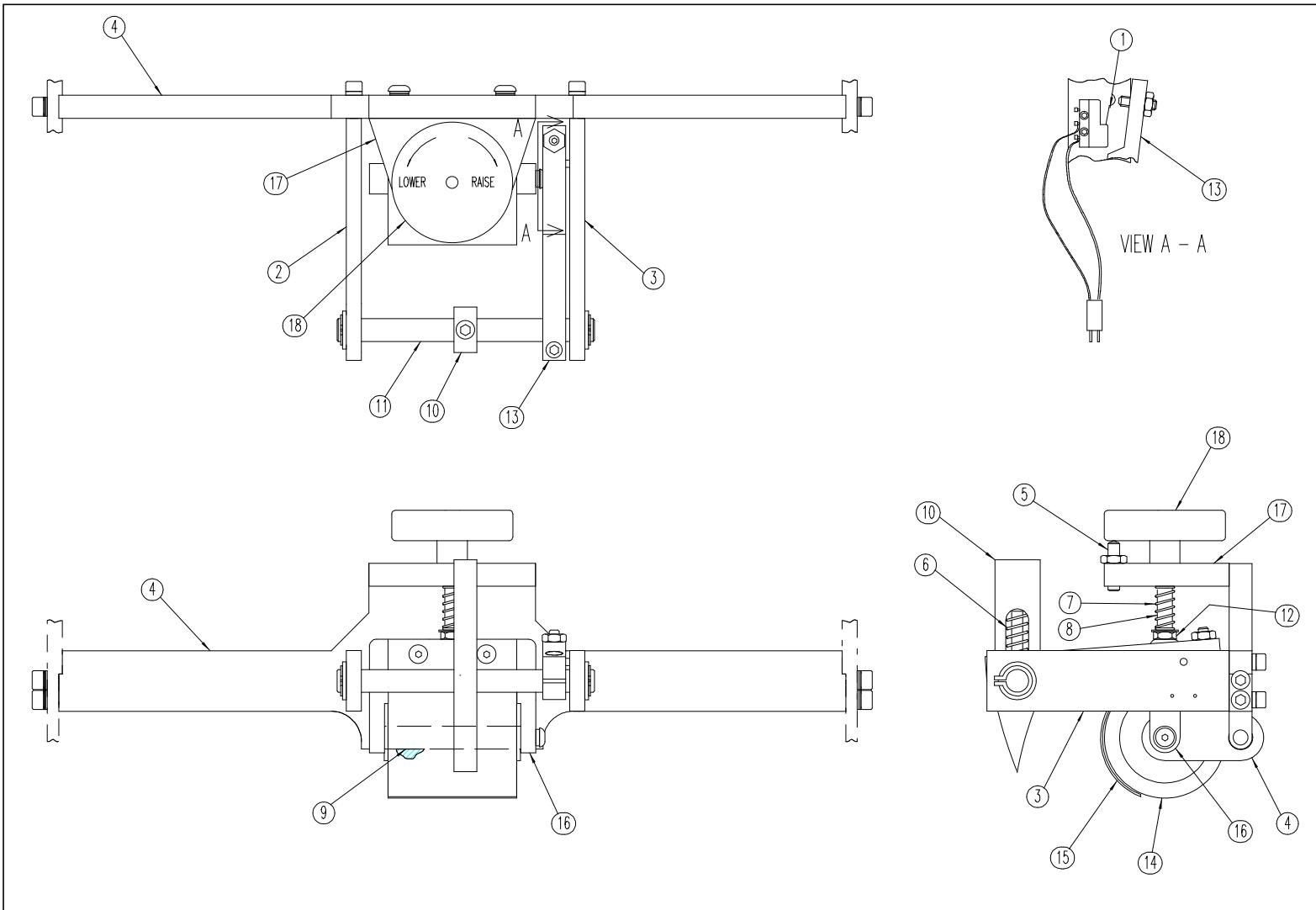
002D-16435, SINGULATOR ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002B-08212	CREEPER CONVEYOR SWITCH
2	002B-16325	INPUT BRACKET
3	002B-16326	INFEED SWITCH BRACKET
4	002C-16500	SUPPORT BAR
5	014-SW15	ADJUSTING SCREW
6	181-03000301000	SPRING
7	181-05000808125	SPRING
8	600A-16435-003	ADJUSTING SCREW
9	600A-16435-004	ROLLER AXLE
10	600A-16435-005	DETENT WAND
11	600A-16435-006	PAPER DETENT AXLE
12	600A-16914	HEX NUT
13	600B-15915-044	STACK SWITCH ACTUATOR
14	600B-16431	SINGULATOR ROLLER
15	600B-16435-002	ROLLER GUARD
16	600B-16435-007	ADJUSTING FORK
17	600B-16435-008	ADJUSTING PLATE
18	600B-16435-009	ADJUSTING KNOB

002B-21905, OUTSIDE FEED BELTS
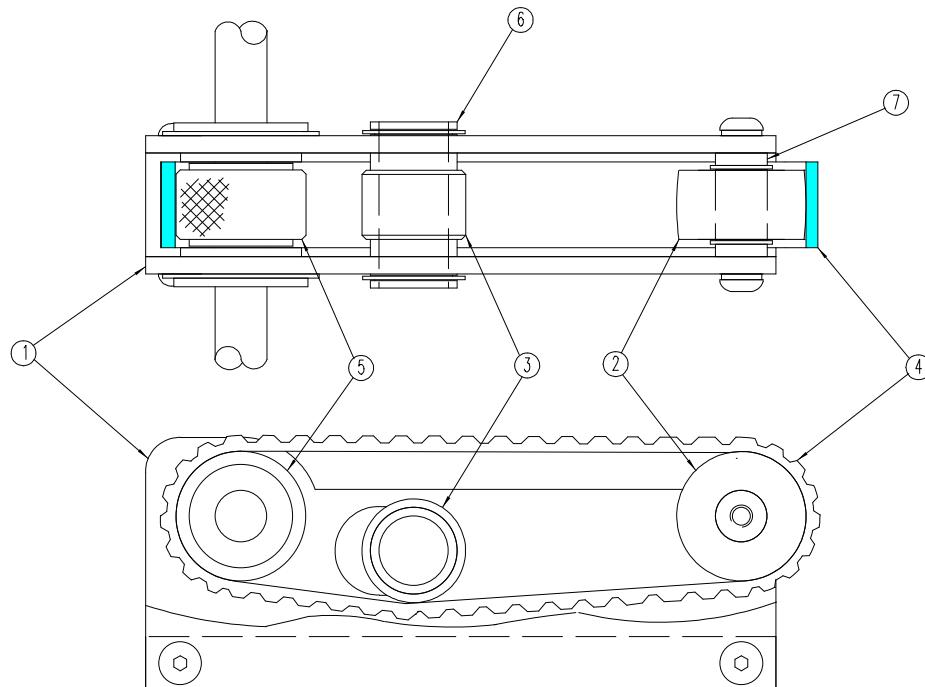
002B-21905, OUTSIDE FEED BELTS

INDEX	PART NUMBER	DESCRIPTION
1	002B-21906	HOUSING ASSEMBLY
2	002A-21927	ROLLER ASSEMBLY
3	600A-22189	IDLER ROLLER
4	186-2823500088	TRACTOR BELT – **Replaced by 118-30307-600**
5	600A-20965	PULLEY
6	600A-21908	BUSHING
7	600A-21909	AXLE

002D-08522, FEEDER ELECTRICAL ASSEMBLY
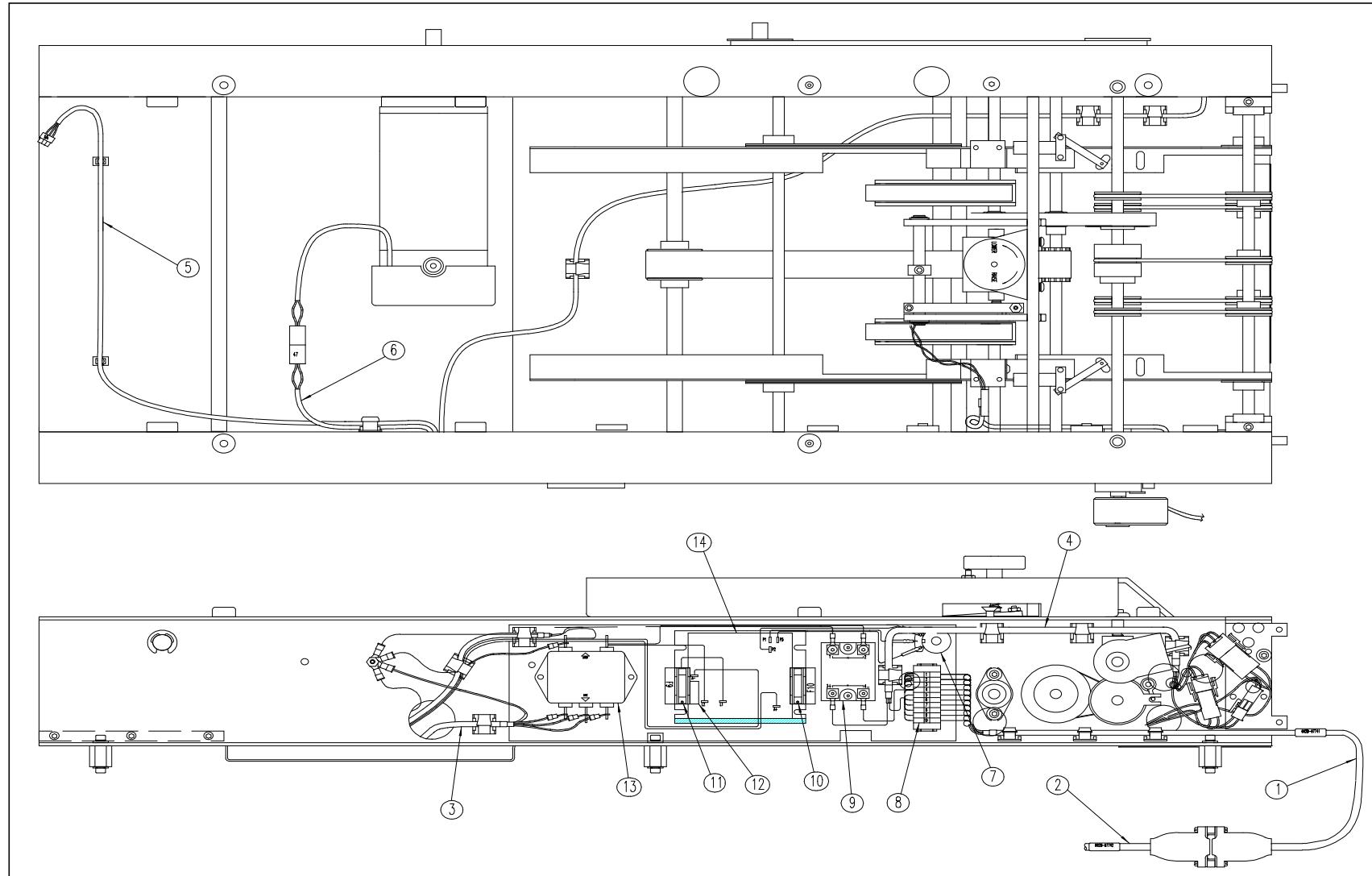
002D-08522, FEEDER ELECTRICAL ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	002B-07741	I/O CABLE
2	002B-07742	I/O #1 INT. CABLE`
3	002C-07627	AC CORD
4	002D-08522-001	SENSOR & SIGNAL CABLE
5	002D-08522-003	CREEPER CABLE
6	002D-08522-004	MAIN MOTOR CABLE
7	002B-08662	SPEED CONTROL POT
8	024-1401019	TERMINAL BLOCK
9	030-1240025	SOLID STATE RELAY
10	032-003/8250	FUSE,3/8 AMP
11	032-10120250	FUSE,12 AMP
12	047-S9841	RESISTOR
13	050-20VDK1	LINE FILTER
14	054-KBIC125	MOTOR CONTROLLER

002D-17505, CREEPER CONVEYOR
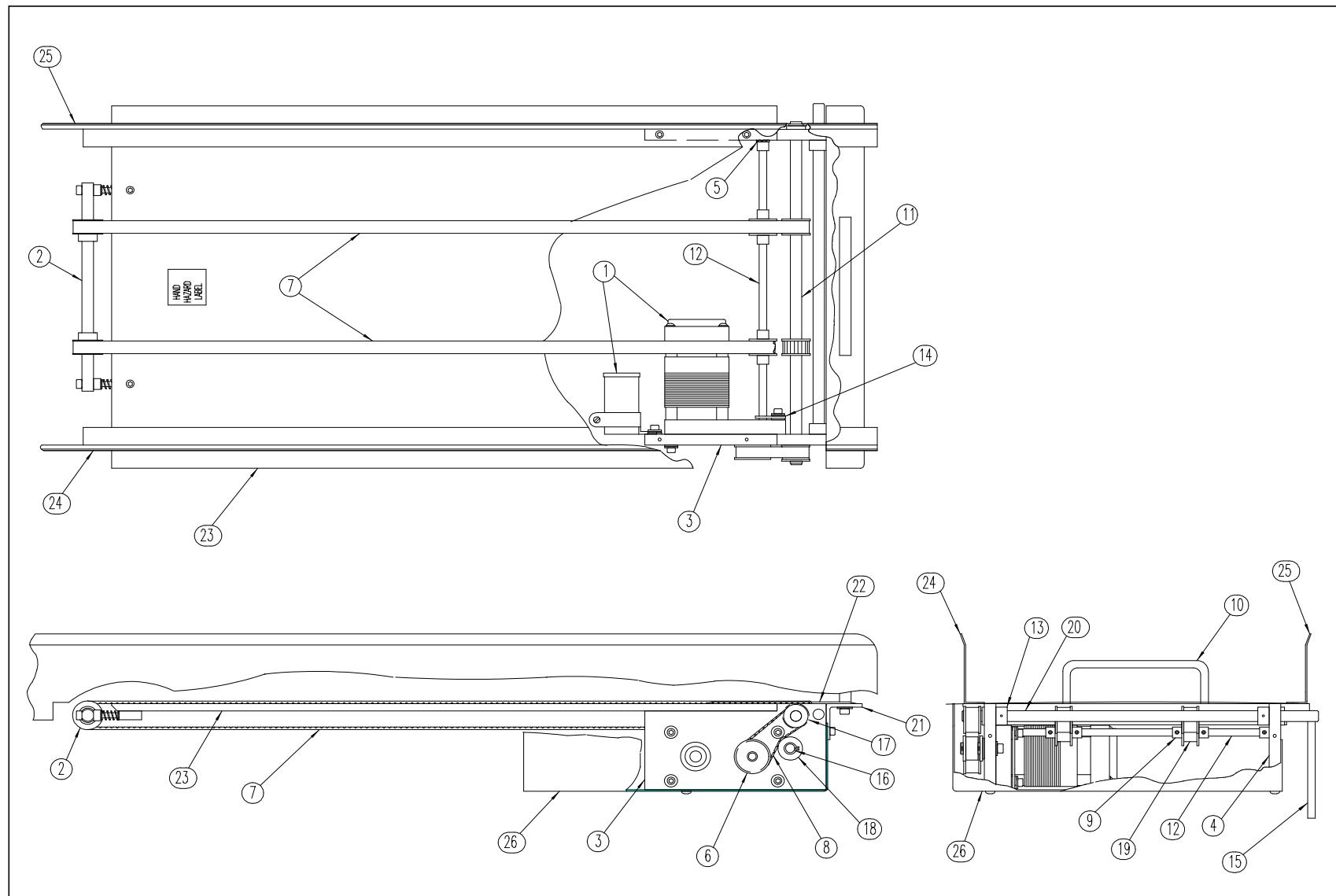
002D-17505, CREEPER CONVEYOR

INDEX	PART NUMBER	DESCRIPTION
1	002B-09341	CREEPER MOTOR
2	002B-16631	FRONT SHAFT ASSEMBLY
3	002B-16633	MOTOR MOUNT PLATE,RIGHT
4	002B-16334	MOTOR MOUNT PLATE,LEFT
5	016-525	WAVY WASHER
6	112-200DBA15625	MOTOR DRIVE PULLEY
7	113-200500037	CONVEYOR BELT
8	113-200070037	DRIVE BELT
9	126-SSC25	SET SCREW COLLAR
10	172-1039A1032	HANDLE
11	600A-15841-009	DRIVE SHAFT
12	600A-15841-011	SHAFT
13	600A-15841-015	STACK GUIDE LOCK ECCENTRIC
14	600B-15841-017	IDLER ROLLER SHAFT BRACKET
15	600A-15841-020	HANDLE
16	600A-15841-021	IDLER STUD
17	112-200NOA14638	PULLEY,TIMING,14T
18	600A-16651	ROLLER
19	600A-16652	ROLLER
20	600B-15841-014	TENSION BAR
21	600B-15841-019	LOCK ANGLE
22	600B-15917-005	MYLAR COVER
23	600C-15841-001	BED
24	600C-16575-001	STACK GUIDE,LEFT
25	600C-16575-002	STACK GUIDE,RIGHT
26	600C-17771	REAR CREEPER COVER

580-26544-500, KEYBOARD ASSEMBLY
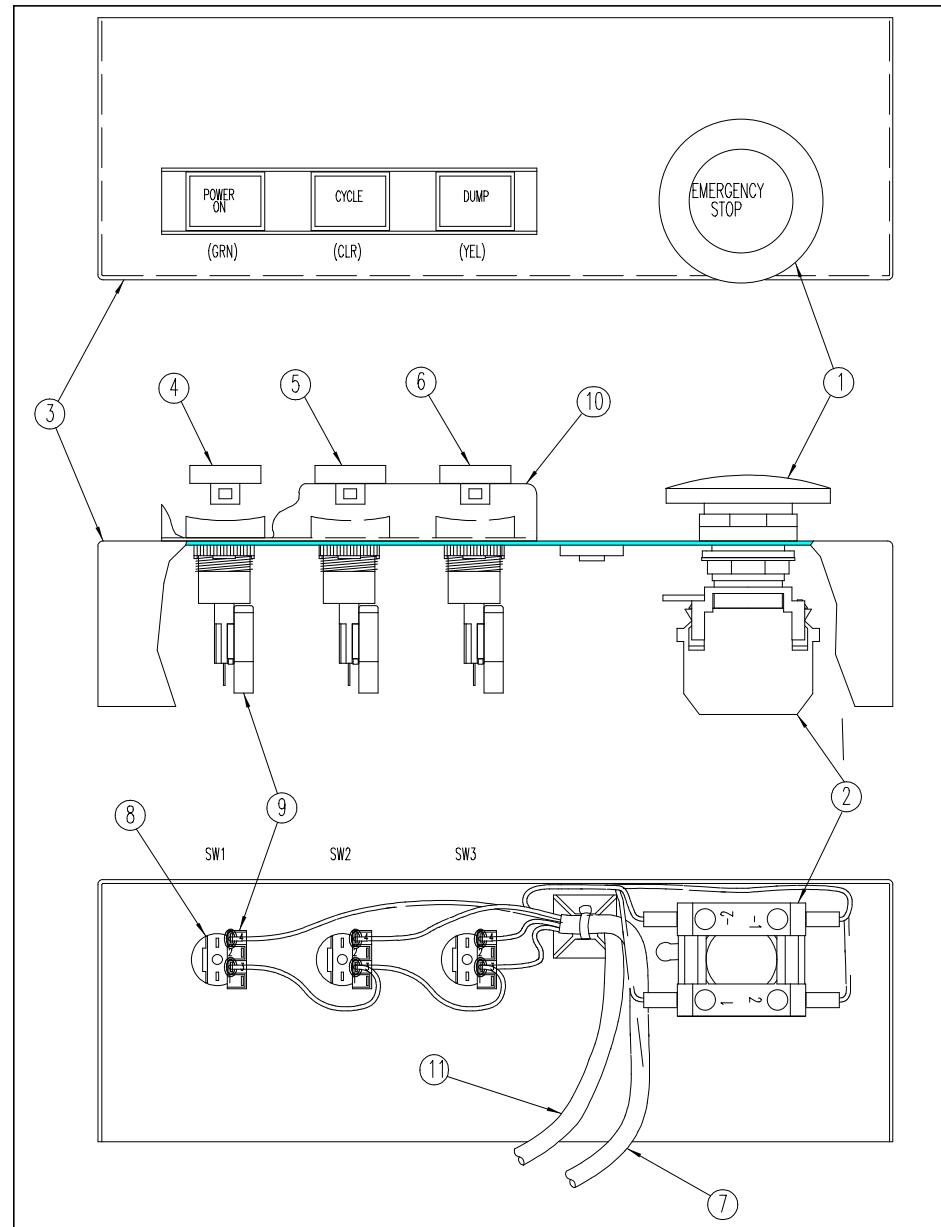
580-26544-500, KEYBOARD ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	041-E22JLB2N8	E-STOP SWITCH
2	041-E22B1	CONTACT BLOCK
3	580-26331-600	PANEL
4	041-ATH01982GRN	GREEN LENS CAP
5	041-ATH01982CLR	CLEAR LENS CAP
6	041-ATH01982YEL	YELLOW LENS CAP
7	002B-08542	KEYBOARD CABLE
8	041-OTH36F220	SWITCH
9	041-ATH25F1	SWITCH ELEMENT
10	600B-20846	KEY FOB
11	046-26204-500	CABLE,HOST E-STOP

702-26612-500, ACCUMULATOR MOD
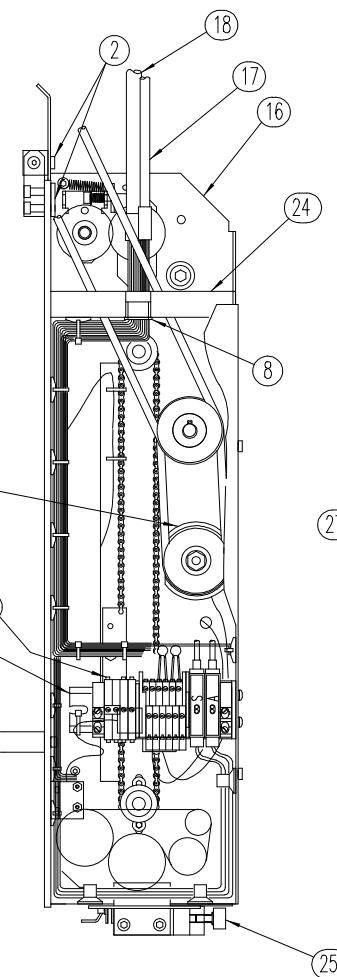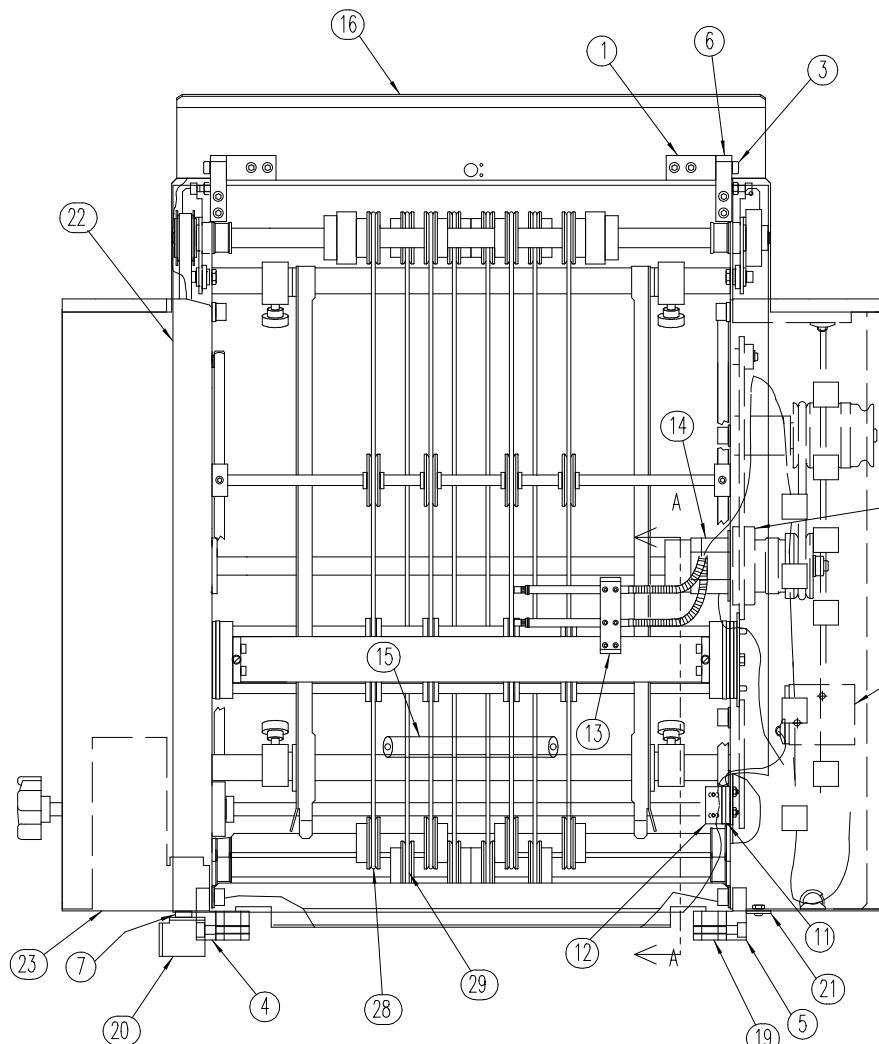
See Section J for MB Accumulator parts manual –

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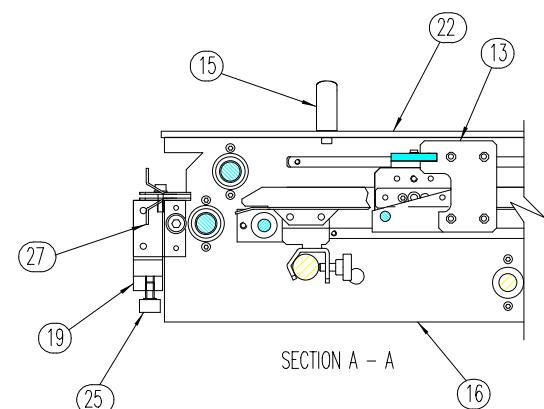
702-26612-500, ACCUMULATOR MOD

INDEX	PART NUMBER	DESCRIPTION
1	007-26561-600	COVER HINGE
2	013-26562-600	NUT PLATE
3	014-25S31308	SHOULDER SCREW,#10-24
4	020-26515-601	SUPPORT,DOCKING PIN
5	020-26515-602	SUPPORT,DOCKING PIN
6	020-26563-600	SUPPORT HINGE
7	020-RA006C0803	STANDOFF,#6CL,.187LG
8	021-SB750625	SNAP BUSHING
9	024-26724-500	TERMINAL BLOCK ASSEMBLY
10	025-25817-000	FERRULE,22AWG
11	041-26739-500	MAGNETIC SWITCH ASSEMBLY
12	041-35701	INTERLOCK MAGNET
13	074-26614-500	A-S SENSOR ASSEMBLY
14	121-26564-500	BRAKE
15	172-10941A1032	HANDLE
16	186-034007665	ACCUMULATOR, MB, see section J
17	526-26740-500	D.C. CONTROL CABLE
18	526-26741-500	CONTROL CABLE
19	563-26513-600	RECEPTACLE
20	579-26346-600	BELT COVER
21	579-26514-600	GEAR COVER
22	579-26560-600	COVER,ACCUMULATOR
23	579-26677-600	BELT COVER
24	584-26779-600	PLATE MOD
25	002A-16497-005	THUMBSCREW ASM,.250-20 X .5
26	1.030.344	CLUTCH
27	144-27015-600	LOWER INFEED GUIDE
28	118-27016-600	TOP BELT
29	118-27017-600	LOWER BELT

024-26724-500, TERMINAL BLOCK ASSEMBLY
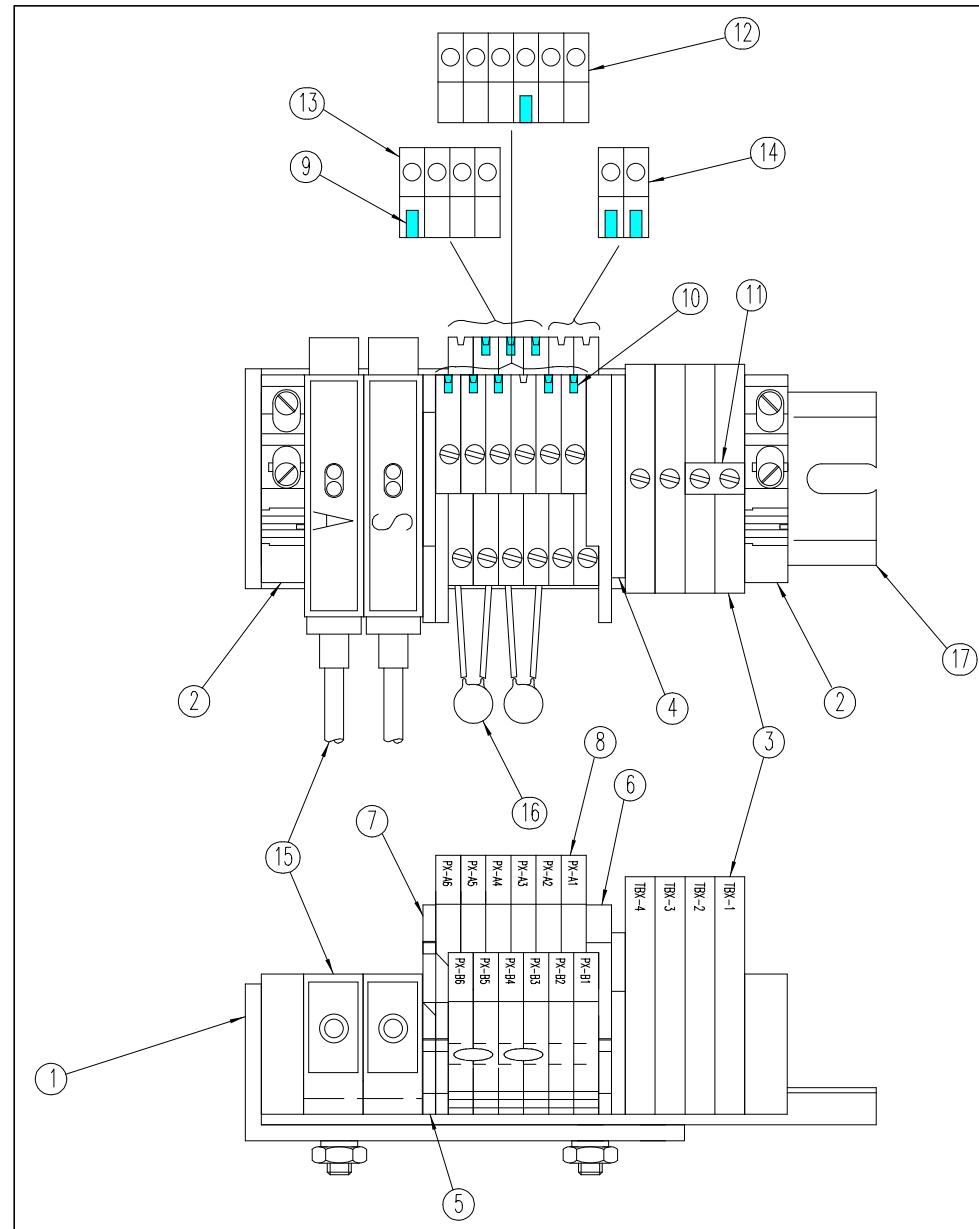
024-26724-500, TERMINAL BLOCK ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	007-26675-600	MOUNTING BRACKET
2	024-10300226	END STOP
3	024-11511607	TERMINAL BLOCK
4	024-11836816	END SECTION
5	024-25821-000	SPACER PLATE
6	024-25822-000	SPACER COVER,RIGHT
7	024-25824-000	END COVER,LEFT
8	024-25825-000	TERMINAL BLOCK
9	024-26022-000	CODING ELEMENT,KEY
10	024-26023-000	CODING ELEMENT,KEY
11	024-26723-000	JUMPER BARS
12	035-25809-000	CONNECTOR,PLUG
13	035-25810-000	CONNECTOR,PLUG
14	035-26030-000	CONNECTOR,PLUG
15	057-26721-500	SENSOR AMP ASSEMBLY
16	067-26722-500	VARISTOR ASSEMBLY
17	194-25606-605	DIN RAIL

703-26611-500, FOLDER MOD, page 1

See Section K for MB
Folder parts manual
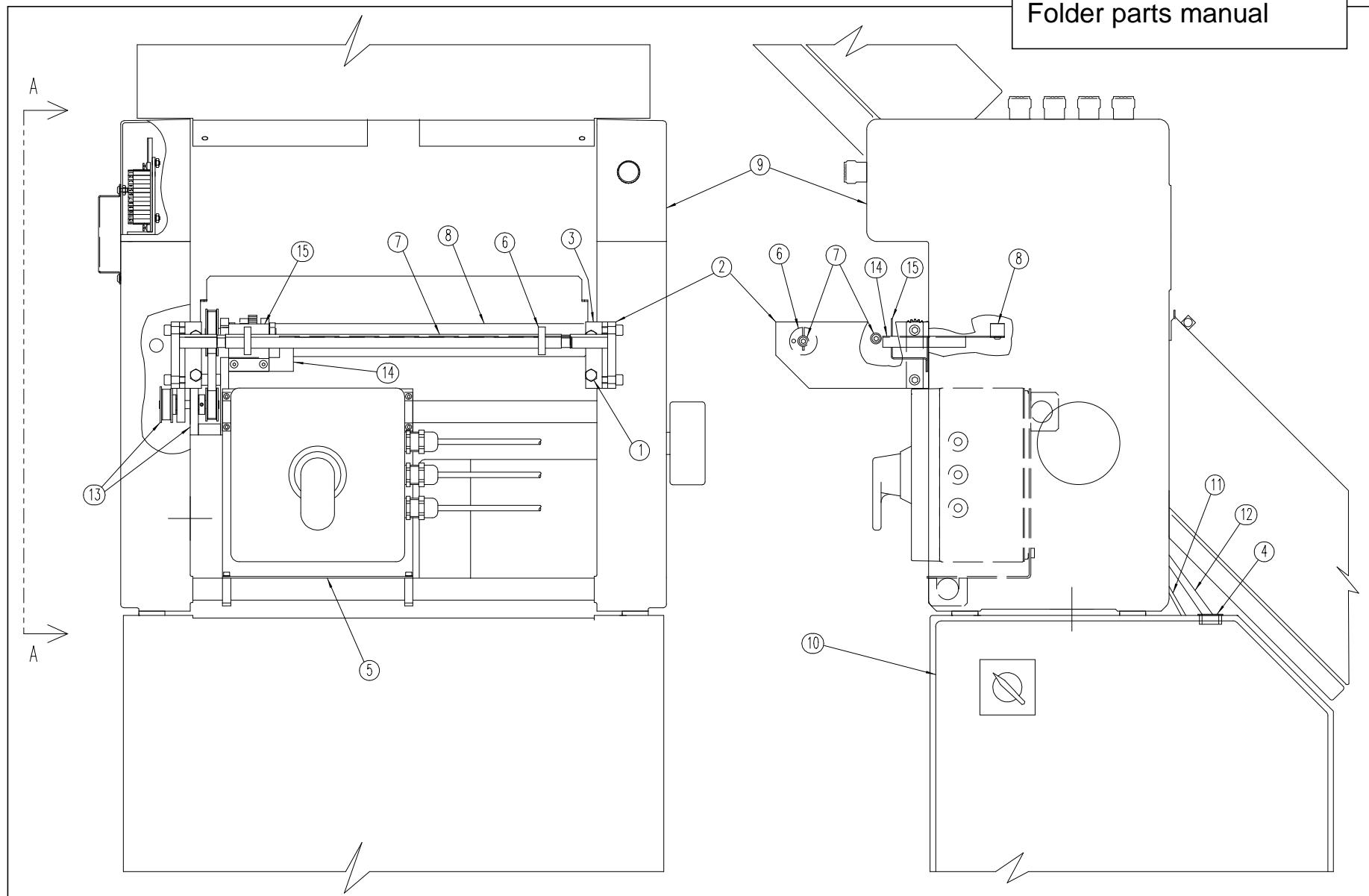
703-26611-500, FOLDER MOD, page 1

INDEX	PART NUMBER	DESCRIPTION
1	014-31862008	BOLT,HH,.312-18 X .50
2	020-26517-600	CONVEYOR SUPPORT FRAME
3	020-26537-600	CONVEYOR SUPPORT
4	021-SB100012	SNAP BUSHING
5	041-26521-500	DISCONNECT SWITCH
6	124-26540-600	COLLAR MOD
7	169-26539-600	TIE BAR
8	169-26543-600	BAR MOD
9	186-034007658	FOLDER, MB, see Section K
10	502-26799-500	FOLDER DRAWER MOD
11	526-26740-500	D.C. CONTROL CABLE
12	526-26741-500	CONTROL CABLE
13	538-26297-500	AUXILIARY DRIVE ASSEMBLY
14	584-26507-600	LOWER GUARD
15	584-26510-600	BRACKET,AUX GEAR

703-26611-500, FOLDER MOD, page 2

See Section K for
MB Folder parts
manual

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703-26611-500, FOLDER MOD, page 2

INDEX	PART NUMBER	DESCRIPTION
1	021-SB4375	SNAP BUSHING
2	021-SB625500	SNAP BUSHING
3	024-26781-500	TERMINAL BLOCK ASSEMBLY
4	025-25817-000	FERRULE,22 AWG
5	041-26739-500	MAGNETIC SWITCH
6	041-26820-500	INTERLOCK SWITCH
7	070-26797-500	ENCODER
	095-26900-600	STUB SHAFT MOD
8	113-200160037	TIMING BELT
9	186-034007658	FOLDER, MB, see Section K
10	526-26740-500	D.C. CONTROL CABLE
11	526-26741-500	CONTROL CABLE
12	526-26796-500	INTERLOCK SWITCH EXT. CABLE
13	538-26297-500	AUXILIARY DRIVE ASSEMBLY
14	579-26518-600	COVER HAT
15	579-26519-600	COVER MOD

538-26297-500, AUXILIARY DRIVE ASSEMBLY
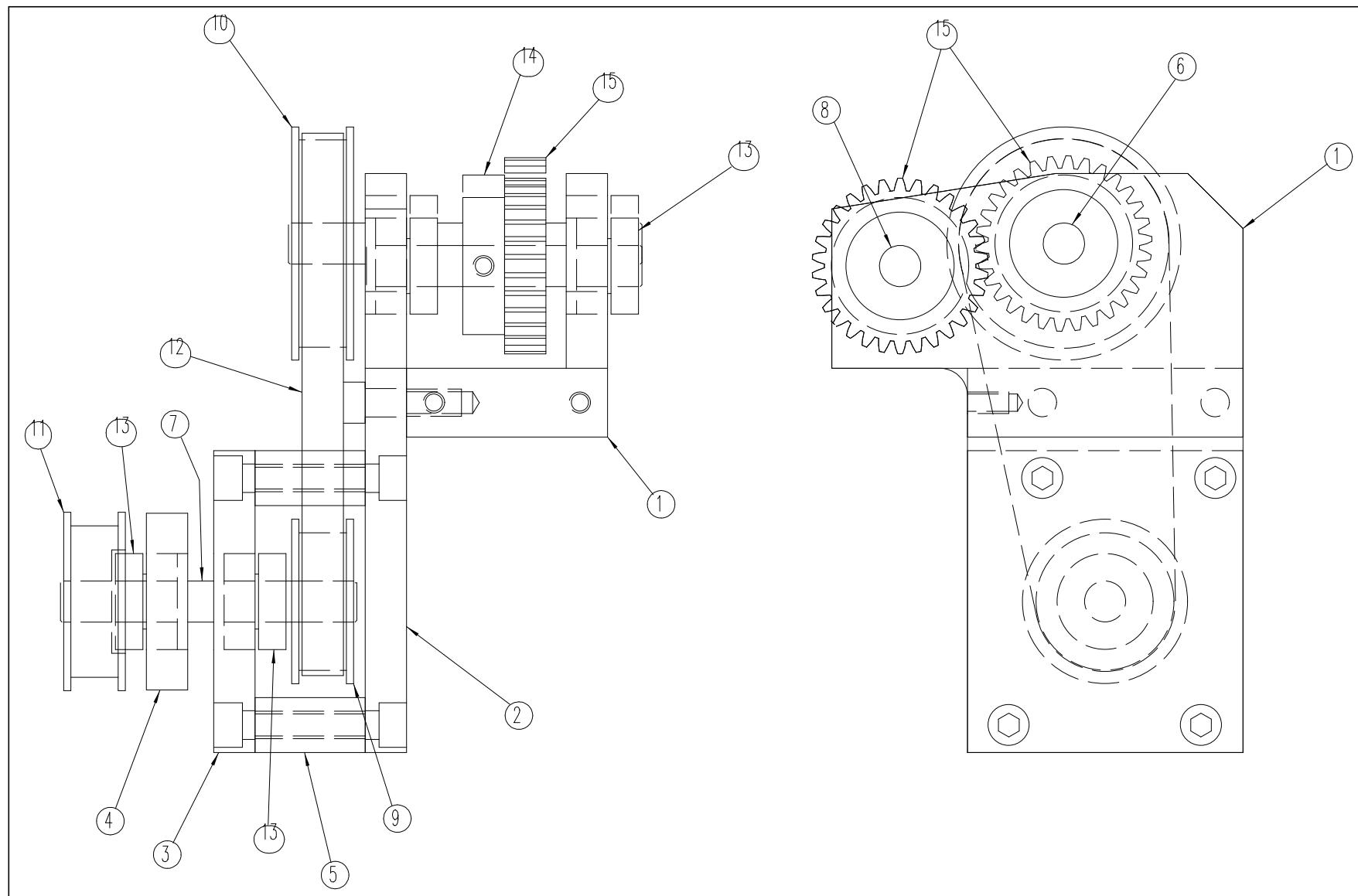
538-26297-500, AUXILIARY DRIVE ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	007-26292-600	BRACKET,AUX. GEAR
2	007-26293-600	IDLER SUPPORT
3	007-26294-600	BRACKET,AUX DRIVE INSIDE
4	007-26295-600	BRACKET,AUX DRIVE OUTSIDE
5	020-26296-600	STANDOFF
6	095-26291-600	GEAR SHAFT
7	095-26382-600	DRIVE SHAFT
8	095-26387-600	STUB SHAFT
9	112-200DOA20637	PULLEY,20T
10	112-200DOA30637	PULLEY,30T
11	112-26311-600	PULLEY,22T
12	113-200116037	TIMING BELT
13	158-S3PPG4	BALL BEARING
14	600A-16349-034	HUB CLAMP
15	600B-16349-027	SPUR GEAR

041-26521-500, DISCONNECT SWITCH ASSEMBLY
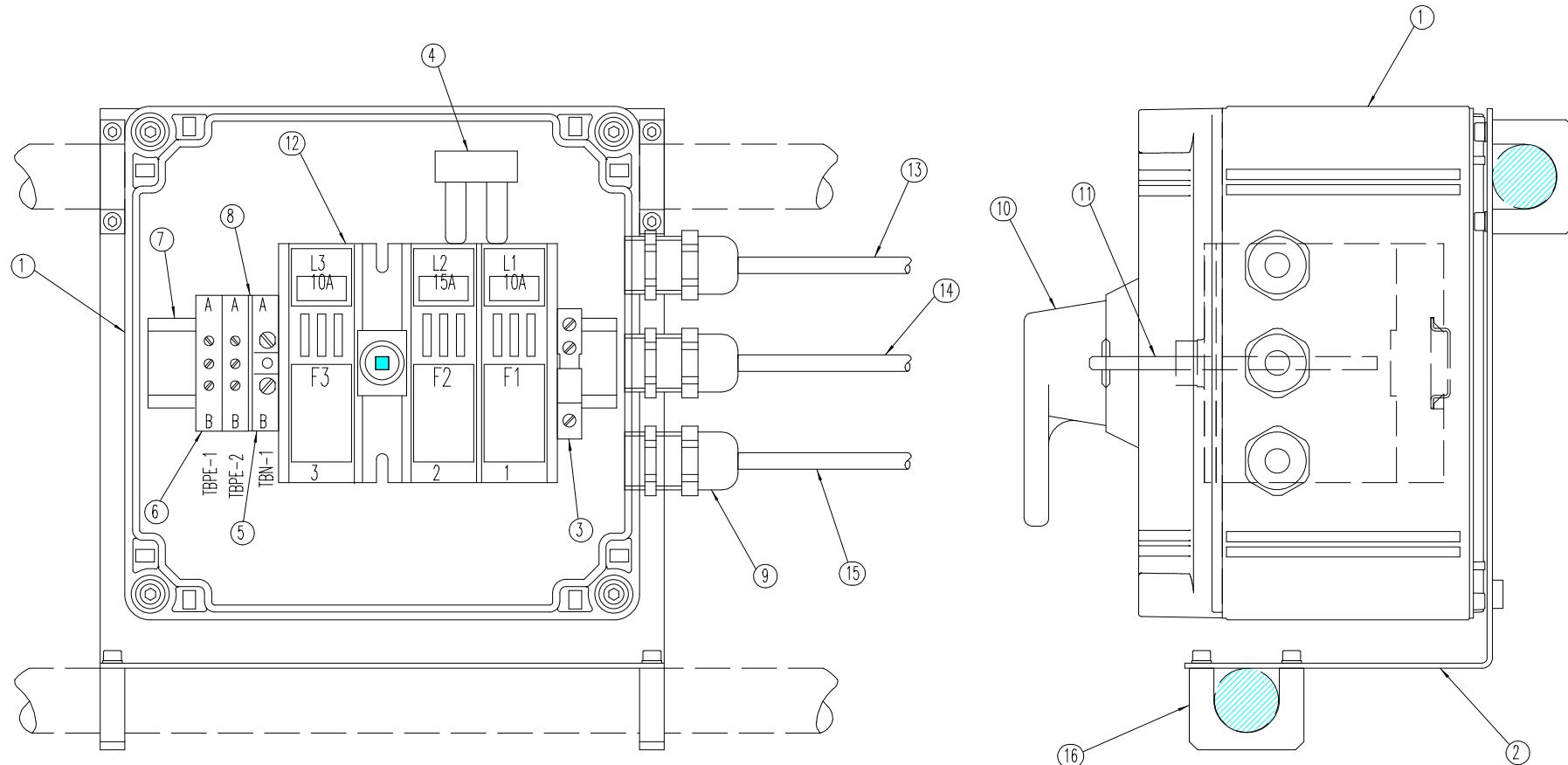
041-26521-500, DISCONNECT SWITCH ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	005-26417-600	ENCLOSURE MOD
2	007-26416-600	BRACKET
3	024-10300226	END CLAMP,TERM BLOCK
4	024-25065	JUMPER BAR,COMB TYPE
5	024-25384-000	TERM BLOCK,NEUTRAL
6	024-25385-000	TERM BLOCK,GROUND
7	024-26509-600	DIN RAIL
8	024-26526-000	TERM BLOCK,END COVER
9	026-26523-000	STRAIN RELIEF CONNECTOR
10	041-26527-000	HANDLE,DISCONNECT SWITCH
11	041-26530-600	SHAFT,DISCONNECT MOD
12	041-26689-000	DISCONNECT SWITCH
13	526-26755-500	MAIN POWER CABLE
14	526-26756-500	FOLDER POWER CABLE
15	526-26757-500	FEEDER POWER CABLE
16	529-26415-600	CLAMP

502-26799-500, FOLDER ELECTRICAL DRAWER MOD

SECTION A – A
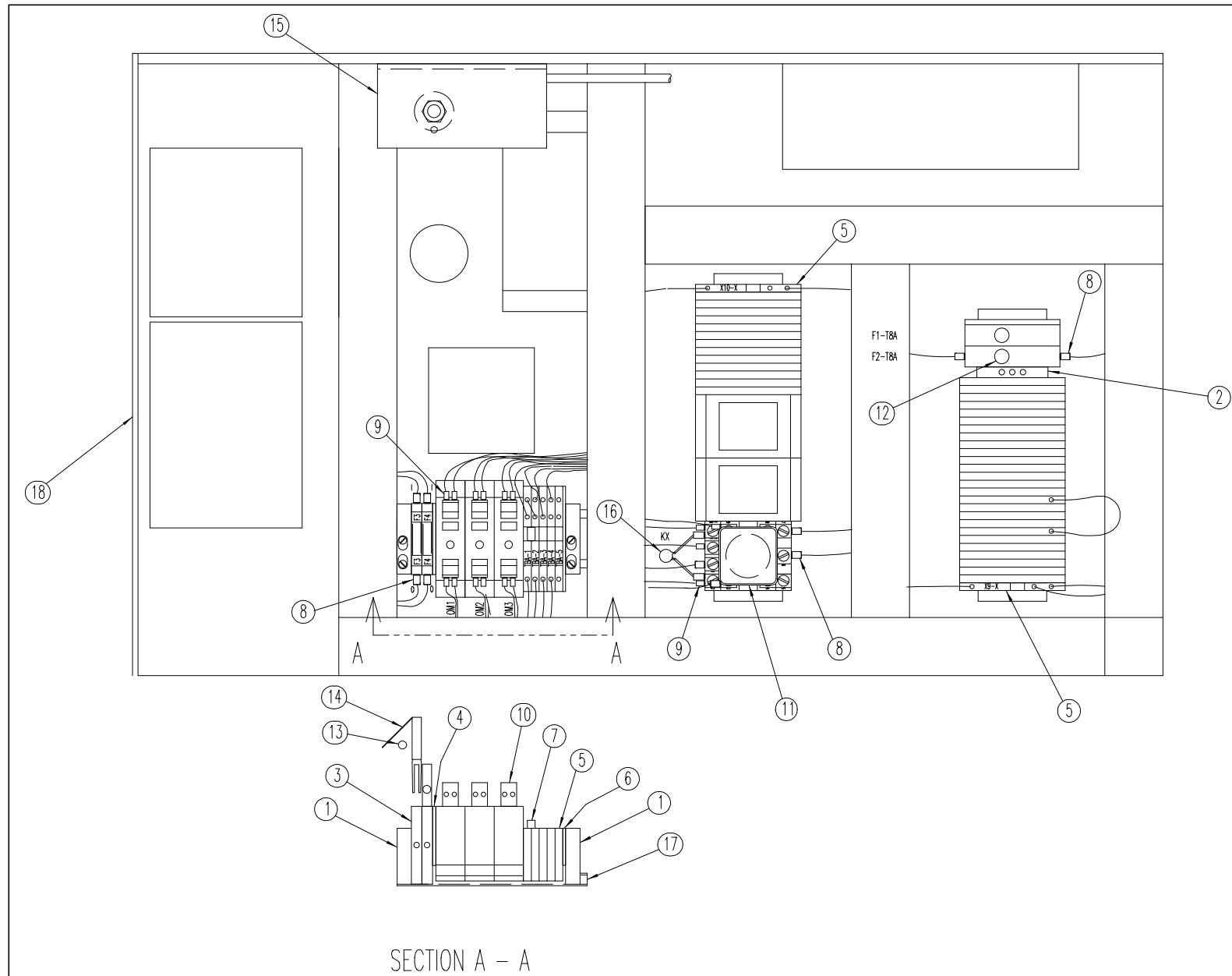
502-26799-500, FOLDER ELECTRICAL DRAWER MOD

INDEX	PART NUMBER	DESCRIPTION
1	024-10300226	END STOP
2	024-26020-000	GROUND,TERM BLOCK
3	024-26787-000	BASE,TERM BLOCK
4	024-26526-000	END COVER
5	024-26789-000	THROUGH TERM BLOCK
6	024-26790-000	END PLATE
7	024-26791-000	ADJACENT JUMPER
8	025-25816-000	FERRULE,16 AWG
9	025-25817-000	FERRULE,22 AWG
10	030-26793-000	OUTPUT MODULE
11	030-2CAD14D10	RELAY,3 PDT,11 PIN
	031-SR3P05	SOCKET,RELAY,11 POS
12	032-25565-000	FUSE,8 AMP
13	032-26794-000	FUSE,.63 AMP
14	033-26786-000	FUSE PLUG
15	049-26784-500	MOTOR SPEED CONTROL
16	067-26722-500	VARISTOR
17	194-26798-600	DIN RAIL
18	186-034007109	FOLDER, MB

750-26525-500, WIDE TRANSPORT CONVEYOR, page 1
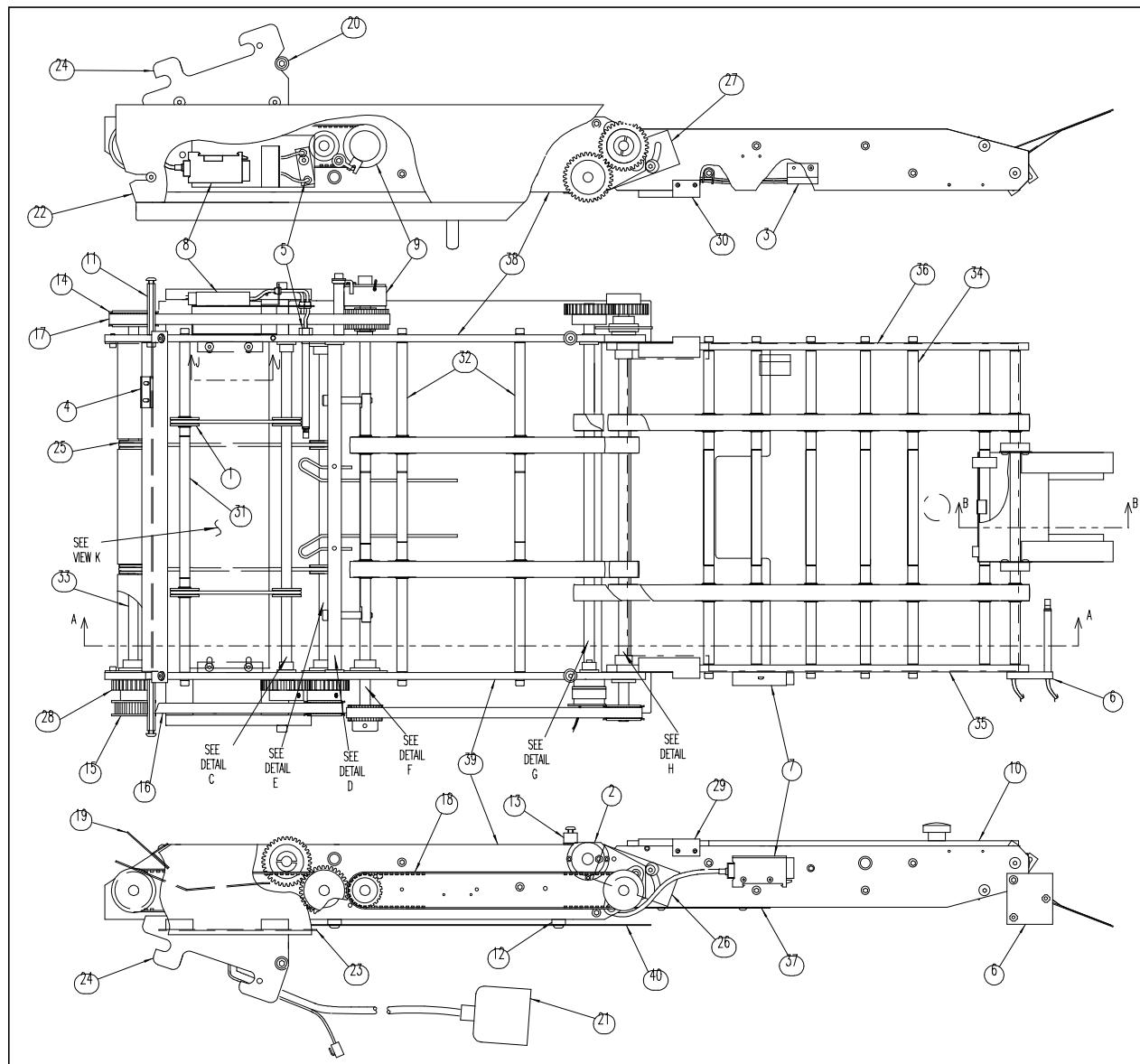
750-26525-500, WIDE TRANSPORT CONVEYOR, page 1

INDEX	PART NUMBER	DESCRIPTION	INDEX	PART NUMBER	DESCRIPTION
1	002A-18044	PULLEY ASSEMBLY	21	526-26327-500	TRANSPORT CABLE
2	002B-08408	BRAKE	22	579-26407-500	COVER
3	002B-08413	MAGNETIC EXTENSION ASM	23	579-26535-600	SHIELD
4	002B-08445	INTERLOCK ASSEMBLY	24	584-26516-600	RIGHT CONVEYOR SUPPORT
5	002B-08457	SENSOR MOUNT ASSEMBLY	25	600A-17700	DRIVE PULLEY
6	002B-08463	SENSOR MOUNT ASSEMBLY	26	600A-17735	RIGHT PIVOT STOP
7	002B-08486	DISCHARGE SENSOR	27	600A-17785	LEFT PIVOT STOP
8	002B-08487	PACKAGE PRESSURE SENSOR	28	600B-16349-027	GEAR
	600B-19011	MOUNT BRACKET		600A-16349-034	HUB CLAMP
9	002B-19599	CLUTCH SHAFT ASSEMBLY	29	600B-18108	RIGHT HINGE
	002B-08409	CLUTCH ONLY	30	600B-18109	LEFT HINGE
	600B-18635	SHAFT ONLY	31	600B-18639	SHAFT
10	002C-18717	CONVEYOR COVER ASM	32	600B-18640	SHAFT
11	020-HS31020830	STANDOFF,#10-32,1.875LG	33	600B-18644	DRIVE SHAFT
12	020-RA025C0803	SPACER,.25CL,.187LG	34	600B-18649	SHAFT
13	020-RA025C0806	SPACER,.25CL,.375LG	35	600C-17708	RIGHT CONVEYOR RAIL
14	112-200DOA25637	TIMING PULLEY,25T	36	600C-17709	LEFT SUPPORT RAIL
15	112-S6A320NF037	TIMING PULLEY,20T	37	600C-18716	SHIELD
16	113-200180037	TIMING BELT,18PL	38	600D-17724	LEFT CONVEYOR SIDE PLATE
17	113-200220037	TIMING BELT,22PL	39	600D-18035	RIGHT CONVEYOR SIDE PLATE
18	113-200230037	TIMING BELT,23PL	40	600D-18633	SHIELD
19	144-26309-600	INFEED GUIDE			
20	169-26538-600	TIE BAR HANDLE			

750-26525-500, WIDE TRANSPORT CONVEYOR, page 2
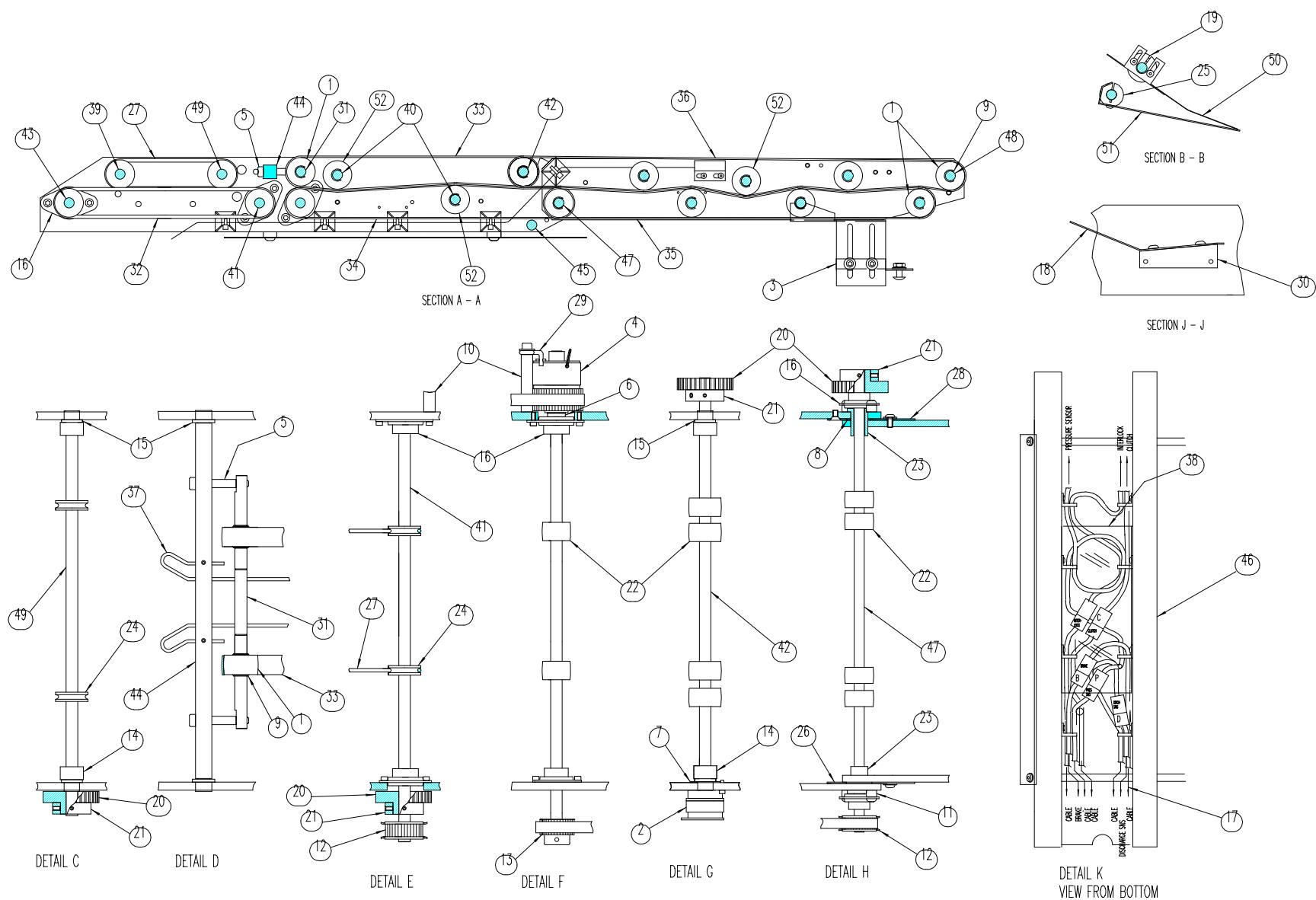
SECTION A – A

SECTION B – B

SECTION J – J

DETAIL C

DETAIL D

DETAIL E

DETAIL F

DETAIL G

DETAIL H

DETAIL K
VIEW FROM BOTTOM

750-26525-500, WIDE TRANSPORT CONVEYOR, page 2

INDEX	PART NUMBER	DESCRIPTION	INDEX	PART NUMBER	DESCRIPTION
1	002A-17309	IDLER ROLLER ASSEMBLY	27	600A-17742	UPPER ROUND BELT
2	002B-08408	BRAKE ASSEMBLY	28	600A-17785	LEFT PIVOT STOP
3	002B-18366	CONVEYOR DOCKING PORT ASM	29	600A-18200	CLUTCH STOP
4	002B-19599	CLUTCH SHAFT ASSEMBLY	30	600A-18568	MOUNT BLOCK
	002B-08409	CLUTCH ONLY	31	600B-17689	NIP ROLLER IDLER
	600B-18635	SHAFT ONLY	32	600B-17743	LOWER ROUND BELT
5	014-S91264A249	BOLT,SHOULDER,#10-24	33	600B-17744	UPPER IDLER BELT
6	016-S0375062512	SHIM,.375ID,.625OD,.12THICK	34	600B-17745	LOWER DRIVE BELT
7	016-S05000750031	SHIM,.500ID,.750OD,.031THICK	35	600B-17746	LOWER EXIT BELT
8	016-S0630087506	SHIM,.063ID,.875OD,.06THICK	36	600B-17747	UPPER EXIT BELT
9	019-200037	'E' RING,EXTERNAL	37	600B-17888	PAPER GUIDE
10	020-RA01020630	STANDOFF,#10-32,1.875LG	38	600B-18165	TRANSPORT WIRE GUARD
11	020-RA010C0604	SPACER,#10CL,.25LG	39	600B-18639	SHAFT
12	112-S6A320H3712	TIMING PULLEY,20T	40	600B-18640	SHAFT
13	112-S6A320NF037	TIMING PULLEY,20T	41	600B-18642	DRIVE SHAFT
14	126-SC37	SET SCREW COLLAR	42	600B-18643	SHAFT
15	153-FB683	BEARING,.375ID,.50D	43	600B-18644	DRIVE SHAFT
16	158-S3PPB5ST	RADIAL BEARING	44	600B-18645	NIP WHEEL PIVOT BAR
17	526-26327-500	TRANSPORT CABLE	45	600B-18646	TIE BAR
18	584-26310-600	PLATE	46	169-26556-600	SUPPORT BAR
19	600A-16342-001	CLAMP COLLAR	47	600B-18648	IDLER SHAFT
20	600A-16349-031	SPUR GEAR	48	600B-18649	SHAFT
21	600A-16349-034	HUB CLAMP	49	600B-18650	UPPER DRIVE SHAFT
22	600A-17224	DRIVE ROLLER	50	600B-19304	UPPER EXIT GUIDE
23	600A-17697	BEARING	51	600B-19305	LOWER EXIT GUIDE
24	600A-17700	DRIVE PULLEY	52	177-27369-500	IDLER ROLLER
25	600A-17733	COLLAR			
26	600A-17735	RIGHT PIVOT STOP			

750-26558-500, NARROW TRANSPORT CONVEYOR, page 1

750-26558-500, NARROW TRANSPORT CONVEYOR, page 1

INDEX	PART NUMBER	DESCRIPTION
1	002A-18044	PULLEY ASSEMBLY
2	002B-08408	BRAKE
3	002B-08413	MAGNETIC EXTENSION ASM
4	002B-08445	INTERLOCK ASSEMBLY
5	002B-08457	SENSOR MOUNT ASSEMBLY
6	002B-08463	SENSOR MOUNT ASSEMBLY
7	002B-08486	DISCHARGE SENSOR
8	002B-08487	PACKAGE PRESSURE SENSOR
9	002B-19599	CLUTCH SHAFT ASSEMBLY
	002B-08409	CLUTCH ONLY
	600B-18635	SHAFT ONLY
10	002C-18243	CONVEYOR COVER ASM
11	020-HS31020830	STANDOFF,#10-32,1.875LG
12	020-RA025C0803	SPACER,.25CL,.187LG
13	020-RA025C0806	SPACER,.25CL,.375LG
14	112-200DOA25637	TIMING PULLEY,25T
15	112-S6A320H3712	TIMING PULLEY,20T
16	113-200180037	TIMING BELT,18PL
17	113-200220037	TIMING BELT,22PL
18	113-200230037	TIMING BELT,23PL
19	144-26309-600	INFEED GUIDE
20	169-26538-600	TIE BAR HANDLE
21	526-26327-500	TRANSPORT CABLE
22	579-26407-500	COVER
23	579-26535-600	SHIELD
24	584-26516-600	RIGHT CONVEYOR SUPPORT
25	600A-17700	DRIVE PULLEY
26	600A-17735	RIGHT PIVOT STOP
27	600A-17785	LEFT PIVOT STOP
28	584-26310-600	INFEED GUIDE
29	600B-18108	RIGHT HINGE
30	600B-18109	LEFT HINGE
31	600B-18639	SHAFT
32	600B-18640	SHAFT
33	600B-18644	DRIVE SHAFT
34	600B-17693	SHAFT
35	006-26550-600	RIGHT CONVEYOR RAIL
36	006-26554-600	LEFT SUPPORT RAIL
37	600C-18716	SHIELD
38	600D-17724	LEFT CONVEYOR SIDE PLATE
39	600D-18035	RIGHT CONVEYOR SIDE PLATE
40	600C-18140	SHIELD
41	600A-16349-034	HUB CLAMP
	600B-16349-027	SPUR GEAR

750-26558-500, NARROW TRANSPORT CONVEYOR, page 2

SECTION A – A

SECTION B – B

SECTION J – J

DETAIL C

DETAIL D

DETAIL E

DETAIL F

DETAIL G

DETAIL H

DETAIL K

750-26558-500, NARROW TRANSPORT CONVEYOR, page 2

INDEX	PART NUMBER	DESCRIPTION	INDEX	PART NUMBER	DESCRIPTION
1	002A-17309	IDLER ROLLER ASSEMBLY	28	600A-17785	LEFT PIVOT STOP
2	002B-08408	BRAKE ASSEMBLY	29	600A-18200	CLUTCH STOP
3	002B-18366	CONVEYOR DOCKING PORT ASM	30	600A-18568	MOUNT BLOCK
4	002B-19599	CLUTCH SHAFT ASSEMBLY	31	600B-17689	NIP ROLLER IDLER
	002B-08409	CLUTCH ONLY	32	600B-17743	LOWER ROUND BELT
	600B-18635	SHAFT ONLY	33	600B-17744	UPPER IDLER BELT
5	014-S91264A249	BOLT,SHOULDER,#10-24	34	600B-17745	LOWER DRIVE BELT
6	016-S0375062512	SHIM,.375ID,.625OD,.12THICK	35	600B-17746	LOWER EXIT BELT
7	016-S05000750031	SHIM,.500ID,.750OD,.031THICK	36	600B-17747	UPPER EXIT BELT
8	019-26549-600	RETAINING RING	37	600B-17888	PAPER GUIDE
9	019-200037	'E' RING,EXTERNAL	38	600B-18165	TRANSPORT WIRE GUARD
10	020-RA01020630	STANDOFF,#10-32,1.875LG	39	600B-18639	SHAFT
11	020-RA010C0604	SPACER,#10CL,.25LG	40	600B-18640	SHAFT
12	112-S6A320H3712	TIMING PULLEY,20T	41	600B-18642	DRIVE SHAFT
13	112-S6A320NF037	TIMING PULLEY,20T	42	600B-18643	SHAFT
14	126-SC37	SET SCREW COLLAR	43	600B-18644	DRIVE SHAFT
15	153-FB683	BEARING,.375ID,.50D	44	600B-18645	NIP WHEEL PIVOT BAR
16	158-S3PPB5ST	RADIAL BEARING	45	600B-18646	TIE BAR
17	526-26327-500	TRANSPORT CABLE	46	169-26556-600	SUPPORT BAR
18	584-26310-600	INFEED GUIDE	47	600B-18648	IDLER SHAFT
19	600A-16342-001	CLAMP COLLAR	48	600B-17693	SHAFT
20	600A-16349-031	SPUR GEAR	49	600B-18650	UPPER DRIVE SHAFT
21	600A-16349-034	HUB CLAMP	50	600B-19304	UPPER EXIT GUIDE
22	600A-17224	DRIVE ROLLER	51	600B-19305	LOWER EXIT GUIDE
23	600A-17697	BEARING	52	144-26615-600	SUPPORT PLASTIC
24	600A-17700	DRIVE PULLEY	53	320-26548-600	PIVOT BLOCK
25	600A-17733	COLLAR	54	522-26547-600	BUSHING SPACER
26	600A-17735	RIGHT PIVOT STOP	55	177-27369-500	IDLER ROLLER
27	600A-17742	UPPER ROUND BELT			

706-25697-400, GBR LINE CODE READ OPTION

SECTION A – A

SECTION B – B

LOOKING DOWN

LOOKING UP

P3A

CHANNEL B

CHANNEL A

VIEW OF READ BOARDS
(FROM INSIDE OF CABINET)
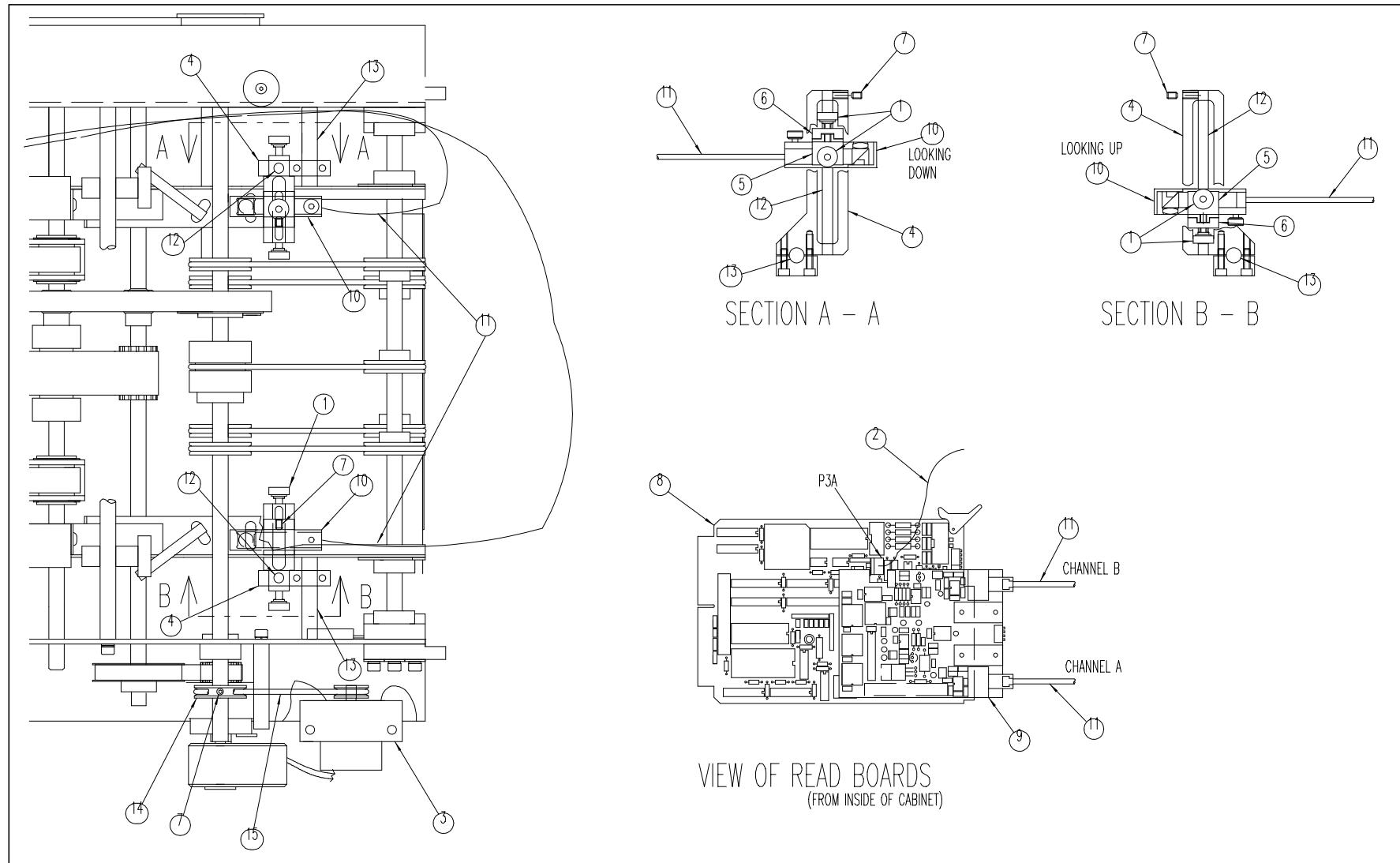
706-25697-400, GBR LINE CODE READ OPTION

INDEX	PART NUMBER	DESCRIPTION
1	002A-16457-004	THUMBSCREW
2	002B-08126	DUAL READ ENCODER CABLE
3	002B-18518	ENCODER
4	007-25586-600	READ HEAD ADJUST BRACKET
5	007-26925-600	BRACKET,MOUNT
6	007-26926-600	BRACKET,READER
7	014-082511040	SHSS,#8-32 X .25,BRASS TIP
8	042-25272-500	SINGLE CHANNEL READ BOARD
9	042-26622-500	GBR OMR SBX ASSEMBLY
10	088-25588-500	READ HEAD ASSEMBLY
11	192-50122302B	FIBER OPTIC READER PROBE
12	595-25585-600	SHAFT
13	595-25698-600	STUB SHAFT
14	600A-18374	PULLEY
15	600A-18378	BELT

088-26574-500, LASER SCANNER ASSEMBLY

FEEDER

CABINET
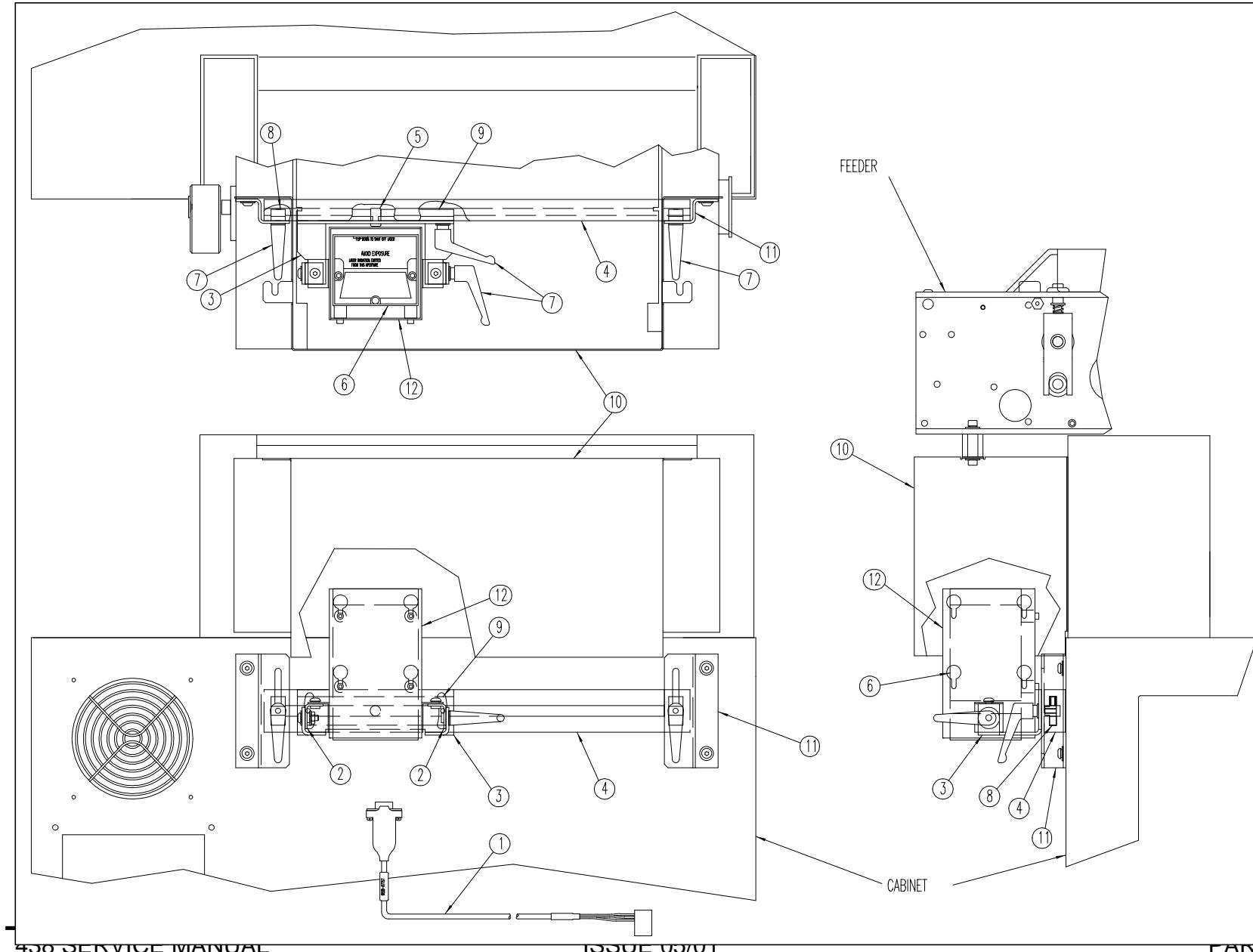
088-26574-500, LASER SCANNER ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	526-27172-500	SCANNER CABLE
2	007-26569-600	ANGLE BRACKET
3	007-26572-600	LASER MOUNT BRACKET
4	007-26573-600	SCANNER SLIDE
5	018-13750625	DOWEL PIN,.375DIA,.625LG
6	088-01MRB01302	LASER SCANNER
7	172-24280	ADJUSTING LEVER
8	320-26567-600	SLIDE BLOCK
9	320-26568-600	SLIDE ADJUST BLOCK
10	579-26570-600	SCANNER COVER
11	007-26571-600	MOUNT BRACKET
12	600C-20701	SCANNER HOUSING

191-26400-400, TOP MOUNT BAR CODE READER

EXISTING CABINET

SECTION A – A

PLUG INTO
SCANNER CABLE

VIEW B – B
SERIAL BOARD INSERTED INTO
CARD CAGE IN BOTTOM OF CABINET

EXISTING
TOUCHSCREEN
ASSEMBLY

⚠ DANGER

Laser operating.
Protect eyes and
skin from beam.
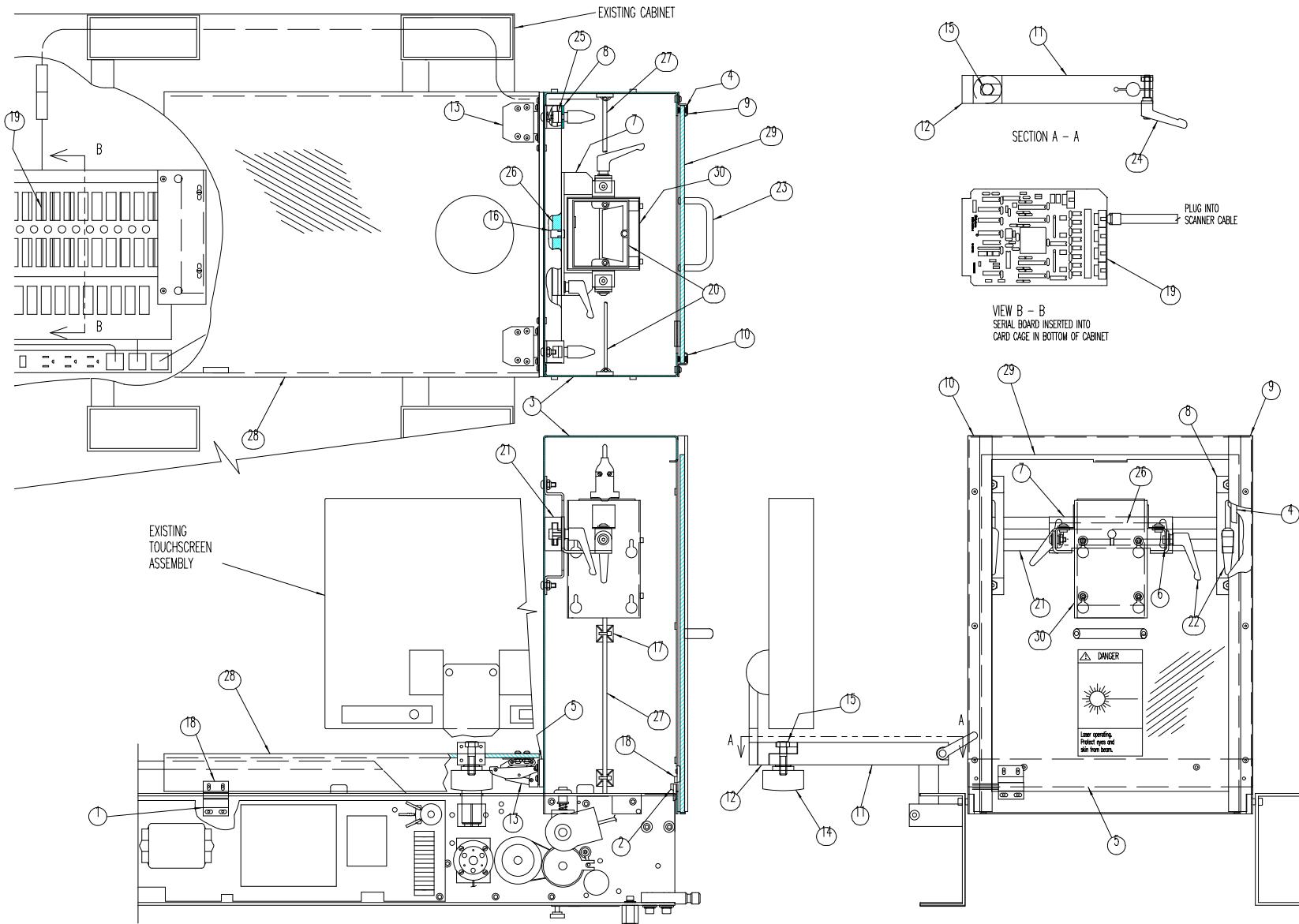
191-26400-400, TOP MOUNT BAR CODE READER

INDEX	PART NUMBER	DESCRIPTION
1	002B-08461	INTERLOCK EXTENDED
2	002B-08569	INTERLOCK SWITCH
3	005-27553-600	LASER HOUSING
4	007-26347-000	SLIDE PILE
5	007-26398-600	COVER SUPPORT
6	007-26569-600	ANGLE BRACKET,SCANNER
7	007-26572-600	BRACKET,LASER MOUNT
8	007-27377-600	BRACKET,SIDE MOUNTING
9	007-27554-600	BRACKET,LEFT DOOR
10	007-27555-600	BRACKET,RIGHT DOOR
11	007-27571-600	SUPPORT BAR
12	007-27572-600	SWIVEL BLOCK
13	007-DLH1154	HINGLE
14	008-27575-000	CLAMP KNOB
15	014-31862220	HEX BOLT,.312-18 x 1.25"
16	018-13750625	PIN,DOWEL,.375DIA x .625"
17	026-ABMMA	TIE WRAP ANCHOR
18	041-35701	MAGNET,INTERLOCK
19	042-27623-500	QUAD SERIAL I/O BOARD
20	088-01MRB01302	LASER SCANNER
21	169-27376-600	SLIDE BAR
22	172-24280	LEVER,ADJUSTING
23	172-26388-000	HANDLE
24	172-27574-000	CLAMP HANDLE
25	320-26567-600	SLIDE BLOCK,SCANNER
26	320-26568-600	SLIDE ADJUST BLOCK,SCANNER
27	526-27172-500	TOUCHSCREEN SCANNER CABLE
28	579-26393-600	FEEDER COVER
29	579-27556-600	LEXAN DOOR
30	600C-20701	HOUSING, SCANNER

088-27684-500, SINGLE CHANNEL-DOUBLE PROBE READ

SECTION A – A

SECTION B – B

SECTION C – C

WIRING SCHEMATIC

SECTION D – D

CONTROL PANEL – LEFT SIDE
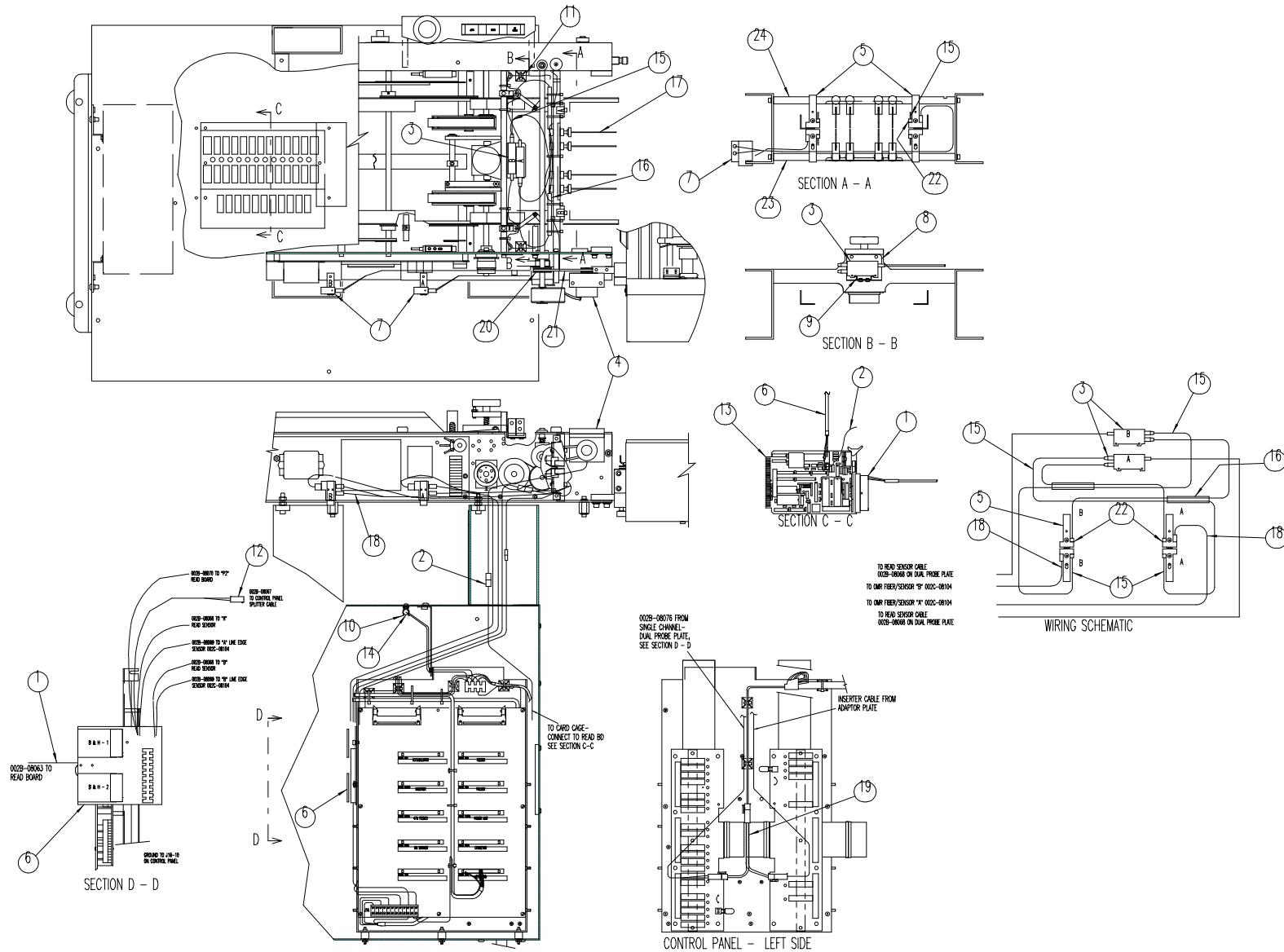
088-27684-500, SINGLE CHANNEL-DOUBLE PROBE READ

INDEX	PART NUMBER	DESCRIPTION
1	002B-08063	DUAL PROBE OUTPUT CABLE
2	002B-08126	DUAL READ ENCODER CABLE
3	002B-08407	LINE CODE SENSOR
4	002B-18518	ENCODER ASSEMBLY
5	002B-19353	BLOCK,READER
6	002C-08013	S. CHANNEL-DUAL PROBE PLATE
	186-330002717	SENSOR AMP BOARD ONLY
7	002C-08104	OMR FIBER SENSOR
8	007-26389-600	BRACKET
9	024-26390-600	DIN RAIL
10	026-450937372C	SPRING CLIP
11	026-ABMMA	TIE WRAP ANCHOR
	026-PLT1MM	TIE WRAP
12	039-39000041	PIN,MALE,18-24 GA
	039-39013023	PLUG,MINI,2 POS
13	042-26908-500	SINGLE CHANNEL READ BOARD
14	047-27782-500	RESISTOR ASSEMBLY
15	057-FT500	SENSOR FIBER
16	140-0250017OE2	TUBING,.25
17	144-27687-500	PAPER GUIDE ASSEMBLY
18	186-330525774	SENSOR SCANNER
19	526-27685-500	SPLITTER CABLE
20	600A-18374	PULLEY
21	600A-18378	BELT
22	600A-19261	SENSOR MOUNT
23	600B-19306	BOTTOM PROBE MOUNT
24	600B-19307	TOP PROBE MOUNT

002K-08432, INSERTER DEMAND SWITCH KIT

BRACKET ONLY USED IF
SHAFT BELOW IS
NOT ON INSERTER
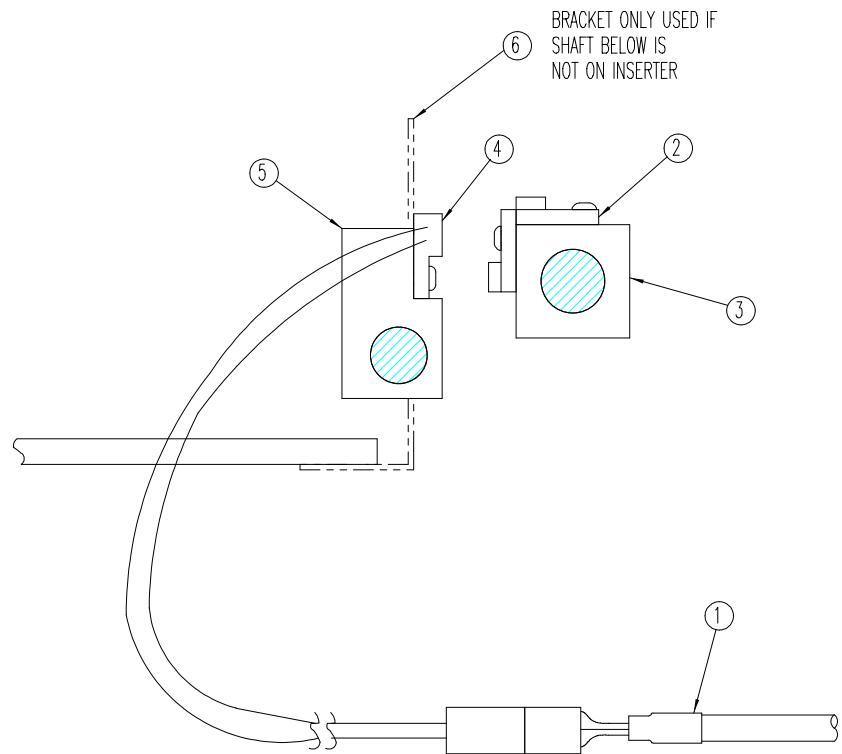
002K-08432, INSERTER DEMAND SWITCH KIT

INDEX	PART NUMBER	DESCRIPTION
1	002B-08460	DEMAND SWITCH
		INTERCONNECT CABLE
2	041-35701	INTERLOCK MAGNET
3	600B-18138	MAGNETIC CAM BLOCK
4	002B-08461	DEMAND BLOCK INTERLOCK
5	600B-18139	SWITCH PIVOT MOUNT
6	600B-18161	SWITCH BRACKET

709-26907-500, TOUCHSCREEN ASSEMBLY

POWER CORD (SUPPLIED
WITH TOUCHSCREEN)
CONNECT TO POWER UNIT

RS–232 TOUCH CABLE
(SUPPLIED WITH TOUCHSCREEN)
CONNECT TO 526–26749–000
MULTIPURPOSE CABLE

VGA SIGNAL CABLE
(SUPPLIED WITH TOUCHSCREEN)
CONNECT TO VGA CONTROLLER

SECTION A – A

SECTION E – E

CONNECT TO
POWER STRIP

CABLE 90 ON
CONTROL PANEL

CABLE 91 ON
CONTROL PANEL

SECTION B – B

CONNECT TO
BACK OF DISK DRIVE

CONNECTS TO
RS–232 TOUCH CABLE

BAR CODE (OPTIONAL)

NOT
USED

SECTION C – C

PLUG INTO
RIGD BOARD

SECTION D – D

709-26907-500, TOUCHSCREEN ASSEMBLY

INDEX	PART NUMBER	DESCRIPTION
1	007-26618-600	CARD CAGE SUPPORT
2	007-26619-600	BRACKET,DISK DRIVE
3	007-26895-600	MOUNT BLOCK
4	007-26896-600	MOUNT BRACKET
5	020-26879-600	DISPLAY MOUNT TUBE
6	027-27280-500	FAN ASSEMBLY
7	032-00015250	FUSE,1.5A,250V
8	042-26622-500	GBX OMR SBX ASSEMBLY
9	042-26746-000	CONTROLLER,VGA & FLAT PANEL
10	042-26750-500	I/O 144 BOARD CONFIGURATION
11	042-26908-500	SINGLE CHANNEL READ BOARD
12	042-26932-500	CIRCUIT BOARD,CPU 486
13	042-ZT21009TFO	CARD CAGE, STD 32
14	042-ZTP101	POWER SUPPLY
15	067-27281-000	6 OUTLET SURGE SUPPRESSOR
16	320-26872-600	DISPLAY CLAMP
17	526-26742-000	CABLE,FLOPPY DRIVE POWER
18	526-26747-000	CABLE,FLOPPY
19	526-26749-000	CABLE,MULTI-PURPOSE
20	605-26412-400	SOFTWARE
21	709-26744-000	LCD TOUCH MONITOR
22	710-26743-000	DRIVE,3.5 FLOPPY

186-035700600, 3208 DOCUMENT LOADER, page 1
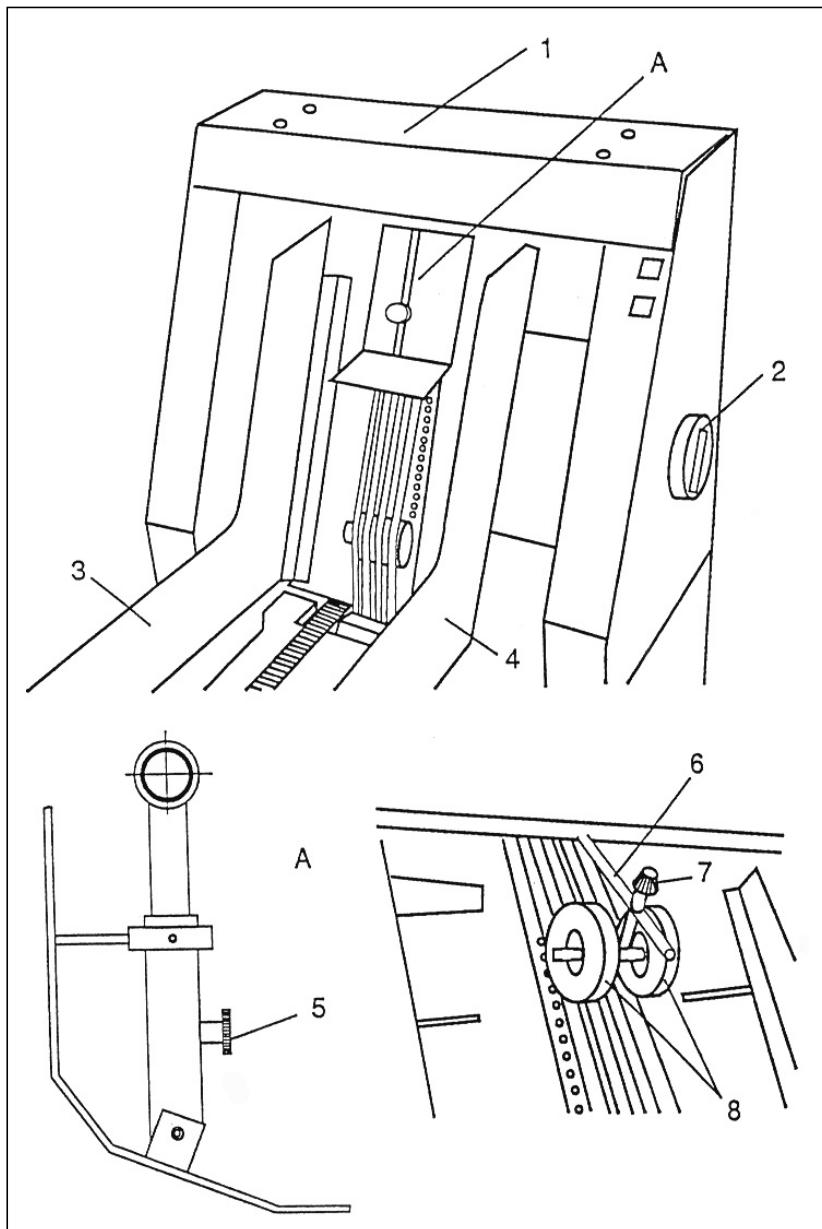
186-035700600, 3208 DOCUMENT LOADER, page 1

INDEX	PART NUMBER	DESCRIPTION
1	4.005.039	COVER,COMPLETE
	1.027.444	HINGE
2	1.027.441	HAND WHEEL
3	4.005.081	LEFT GUIDE RAIL,COMPLETE
	1.027.411	KNURLED SCREW
	1.007107	LEAF SPRING
4	4.005.080	RIGHT GUIDE RAIL,COMPLETE
	1.027.411	KNURLED SCREW
	1.007.107	LEAF SPRING
A	4.005.022	HOLD DOWN,COMPLETE
5	1.155.587	KNURLED SCREW
6	4.005.022	HOLD DOWN,COMPLETE
7	1.114.001	KNURLED SCREW
8	4.005.036	STOP ROLLER

186-035700600, 3208 DOCUMENT LOADER, page 2
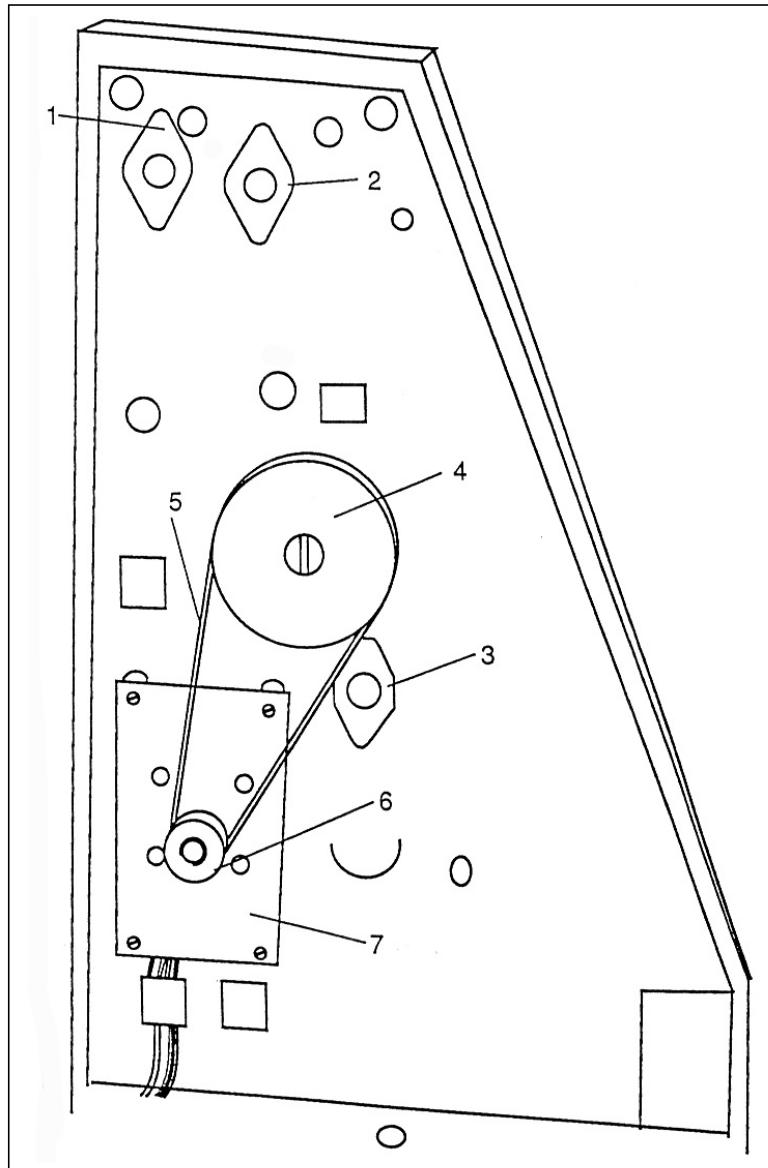
186-035700600, 3208 DOCUMENT LOADER, page 2

INDEX	PART NUMBER	DESCRIPTION
1	4.004.539	BEARING
2	4.004.539	BEARING
3	4.004.539	BEARING
4	4.005.028	PULLEY
5	1.033.006	BELT
6	4.005.025	PULLEY
7	2.022.456	PLATE

186-035700600, 3208 DOCUMENT LOADER, page 3
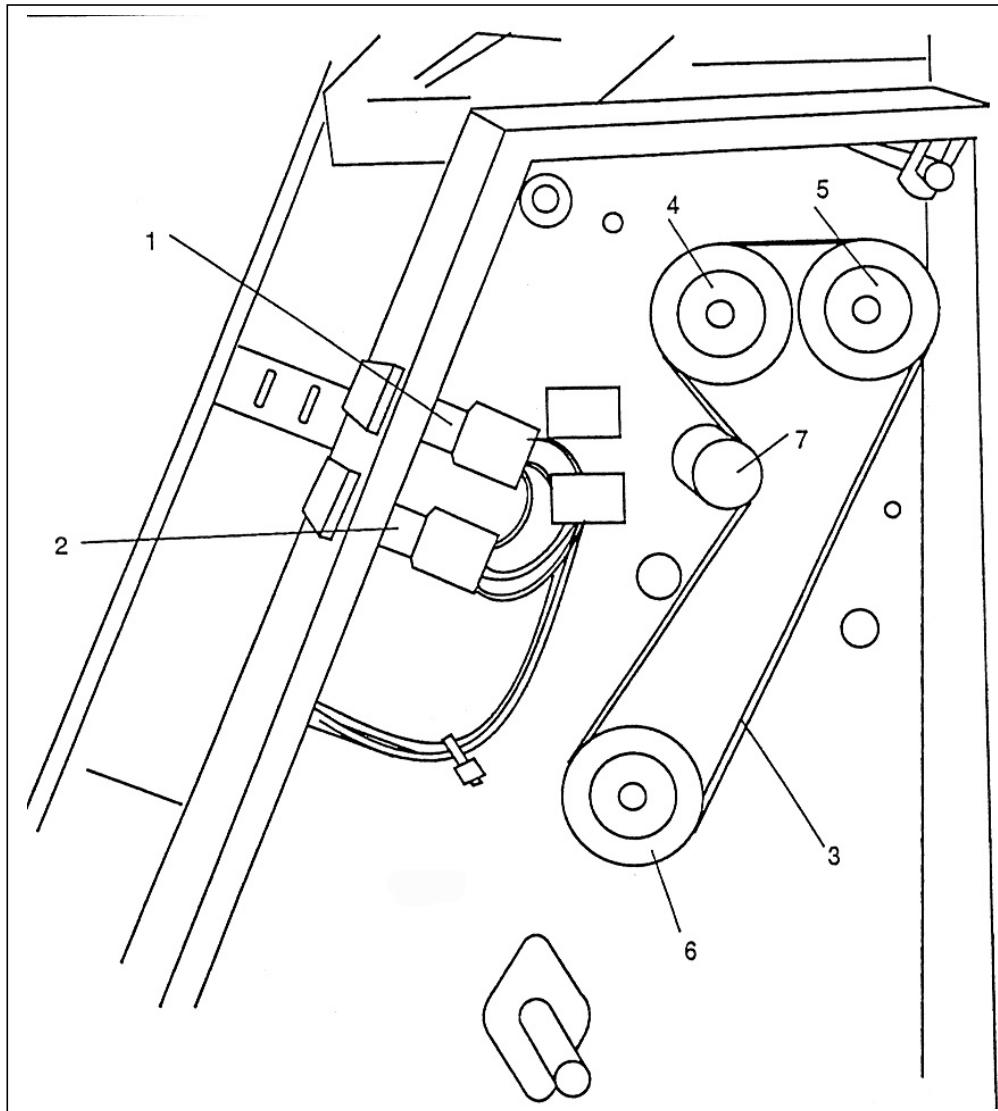
186-035700600, 3208 DOCUMENT LOADER, page 3

INDEX	PART NUMBER	DESCRIPTION
1	1.029.244	SWITCH
2	1.029.244	SWITCH
3	1.033.005	BELT
4	1.027.446	PULLEY
5	1.027.446	PULLEY
6	1.027.445	PULLEY
7	4.005.049	ROLLER

186-035700600, 3208 DOCUMENT LOADER, page 4
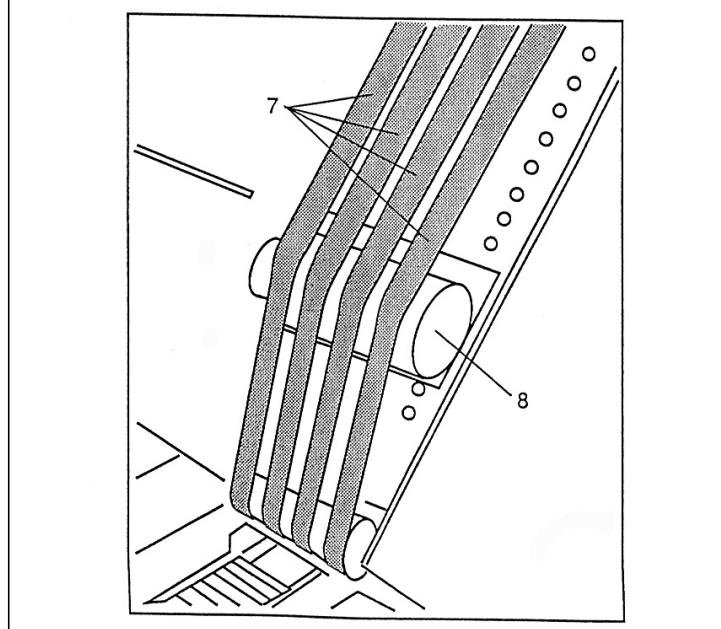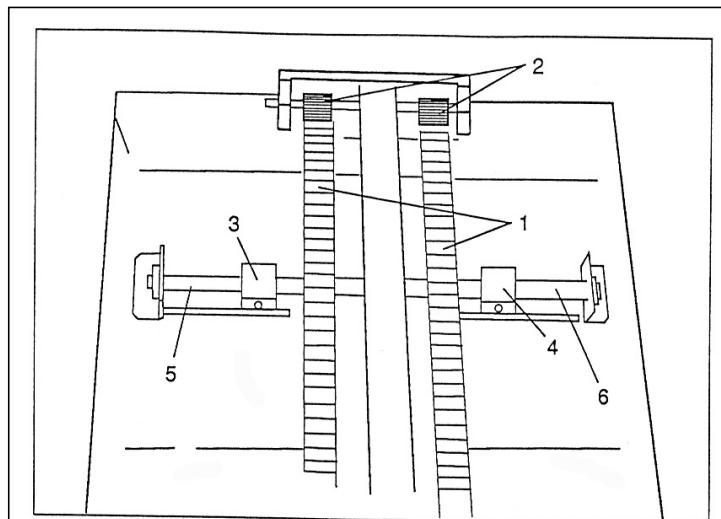
186-035700600, 3208 DOCUMENT LOADER, page 4

INDEX	PART NUMBER	DESCRIPTION
1	1.033.088	BELT
2	1.027.447	ROLLER
3	1.017.504	BUSHING
4	1.017.541	BUSHING
5	2.017.098	RIGHT SHAFT
6	2.017.091	LEFT SHAFT
7	1.031.090	FLAT BELT
8	4.005.032	SIDE UNIT,COMPLETE

186-035700600, 3208 DOCUMENT LOADER, page 5
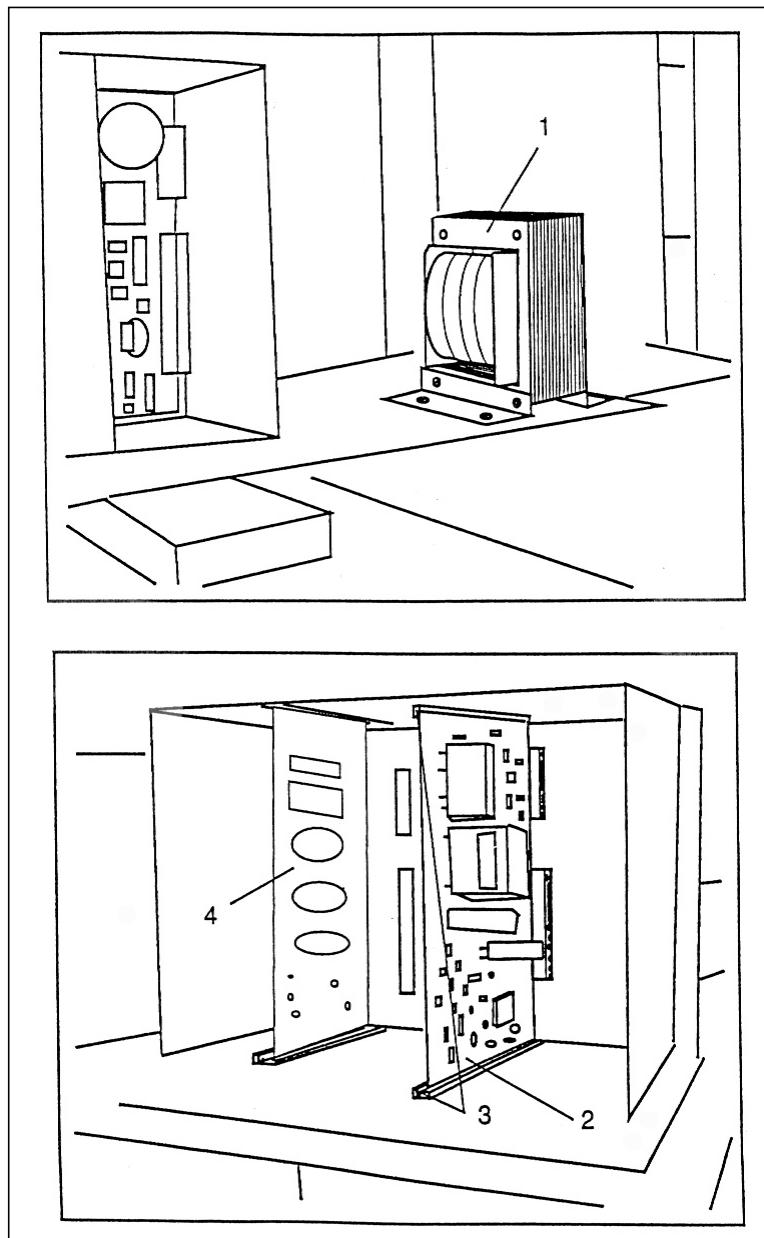
186-035700600, 3208 DOCUMENT LOADER, page 5

INDEX	PART NUMBER	DESCRIPTION
1	1.029.937	TRANSFORMER
2	4.005.097	PC –MB VERSION
	4.005.098	PC –GBR VERSION
3	1.027.190	MOUNTING BRACKET,PCB
4	4.004.419	SPEED CONTROL,220V
	4.004.420	SPEED CONTROL,115V
	4.005.102	MOTOR,220V
	4.005.101	MOTOR,110V

186-035700600, 3208 DOCUMENT LOADER, page 6
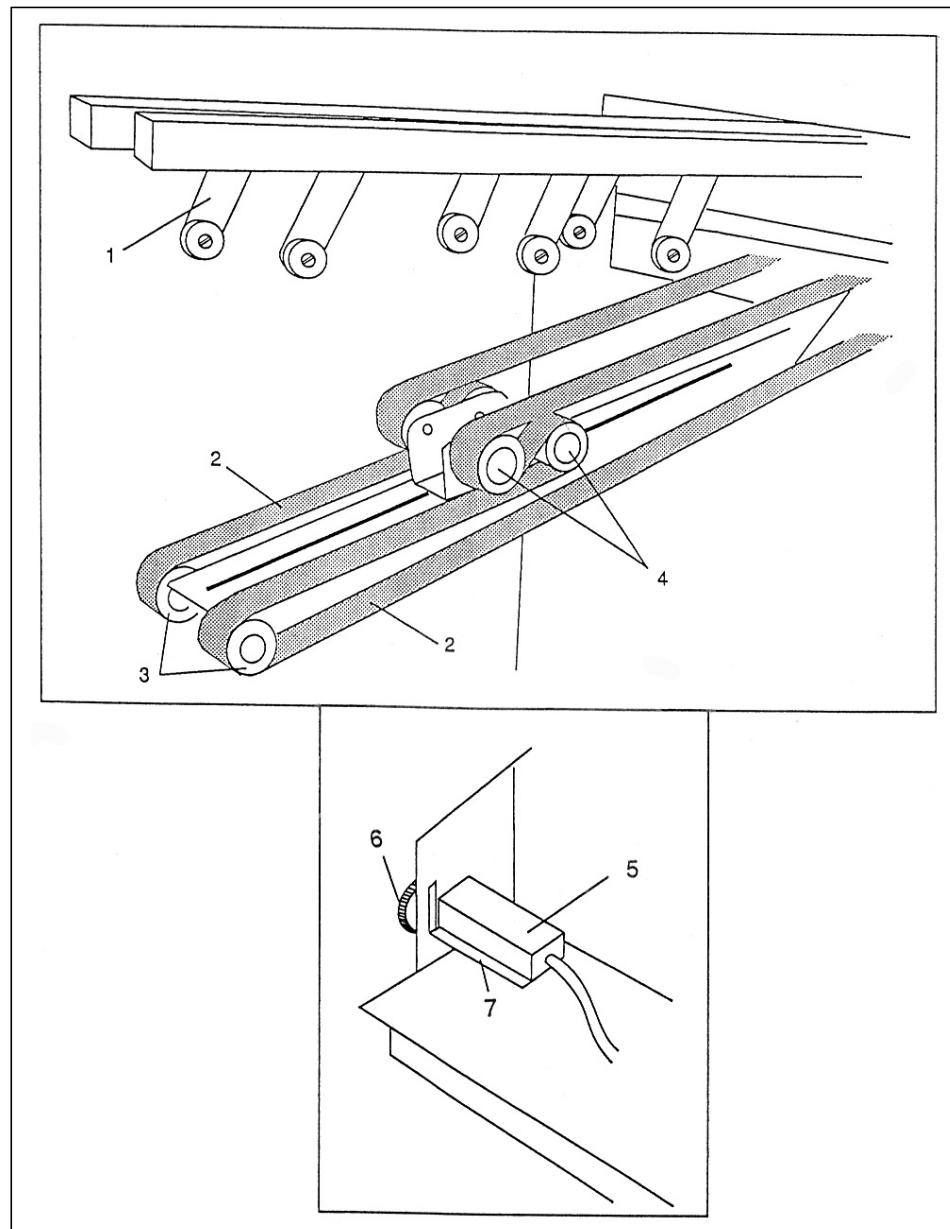
186-035700600, 3208 DOCUMENT LOADER, page 6

INDEX	PART NUMBER	DESCRIPTION
1	4.005.099	HOLD DOWN,COMPLETE
2	1.031.089	BELT
3	4.005.033	ROLLER
4	4.005.033	ROLLER
	3.512.190	LEAF SPRING
5	1.029.910	PHOTODETECTOR
6	1.027.427	KNURLED SCREW
7	2.028.091	BRACKET

750-26978-500, 3208/FEEDER MECH. INTERFACE
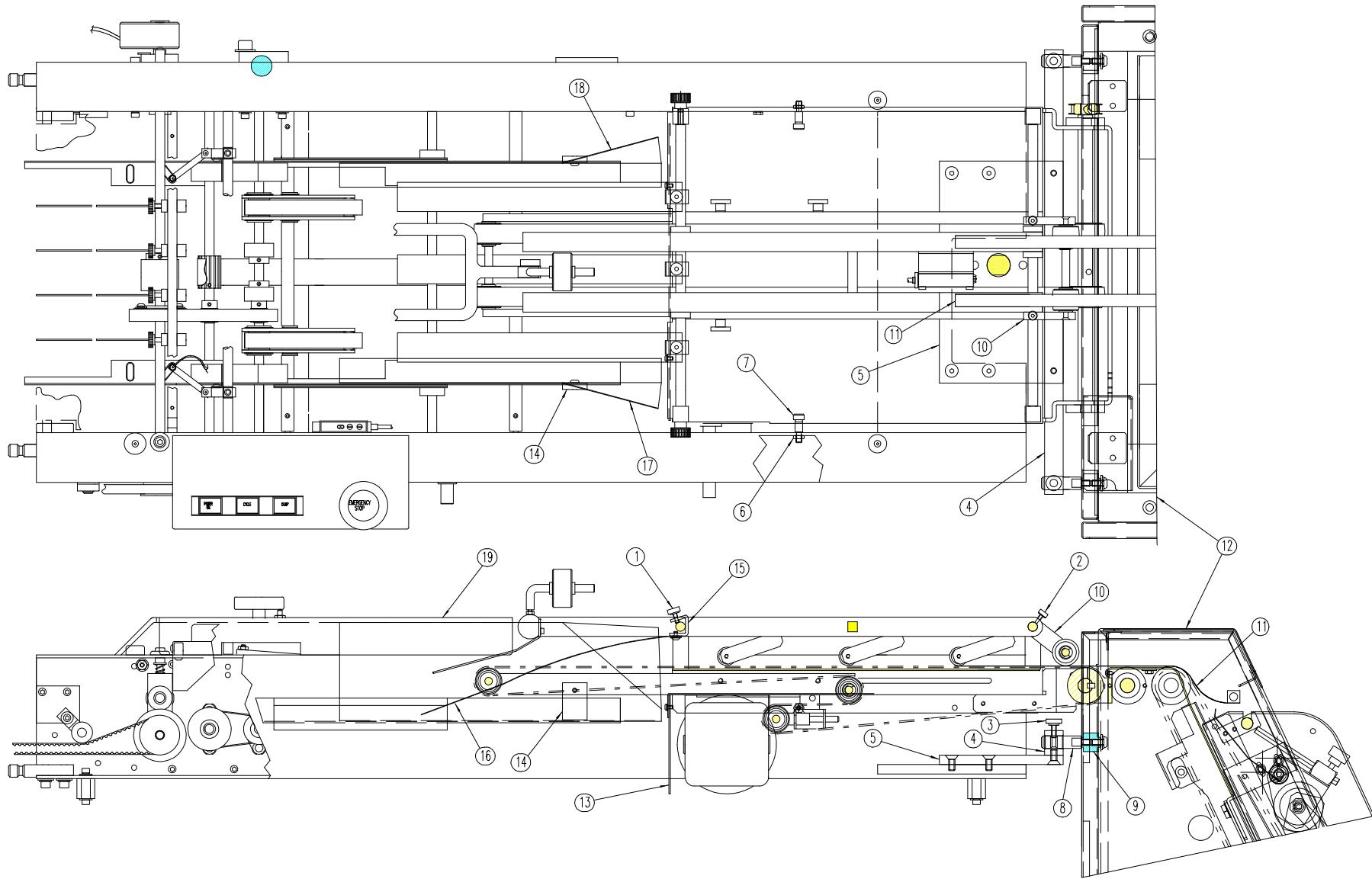
750-26978-500, 3208/FEEDER MECH. INTERFACE

INDEX	PART NUMBER	DESCRIPTION
1	002A-16457-004	THUMBSCREW,#8-32 X .375
2	002A-16495-003	THUMBSCREW,#6-32 X .25
3	002A-16496-005	THUMBSCREW,#10-32 X .5
4	007-26955-600	BRACKET,DOCKING
5	007-26956-600	PLATE,DOCKING
6	013-2104	NUT,NYLOCK,#10-24
7	014-31031308	BOLT,SHOULDER,.312 X .5
8	018-26958-600	PIN,DOCKING
9	020-26957-600	SPACER,DOCKING
10	108-26979-600	LINK MOD
11	144-26981-600	PLASTIC STRIP
12	186-035700675	BULK LOADER
13	584-26980-600	PLATE
14	600A-19367	MOUNT BLOCK
15	600A-23340	CLAMP BRACKET
16	600A-23485	MYLAR STRIP
17	600B-18872	LEFT GUIDE RAIL
18	600B-18873	RIGHT GUIDE RAIL
19	600D-20963	SINGULATOR COVER

750-27737-500, 3208/FEEDER ELECT. INTERFACE, page 1

SECTION A – A

CABLE 526-27412-500
FROM ADAPTOR PLATE

SECTION B – B
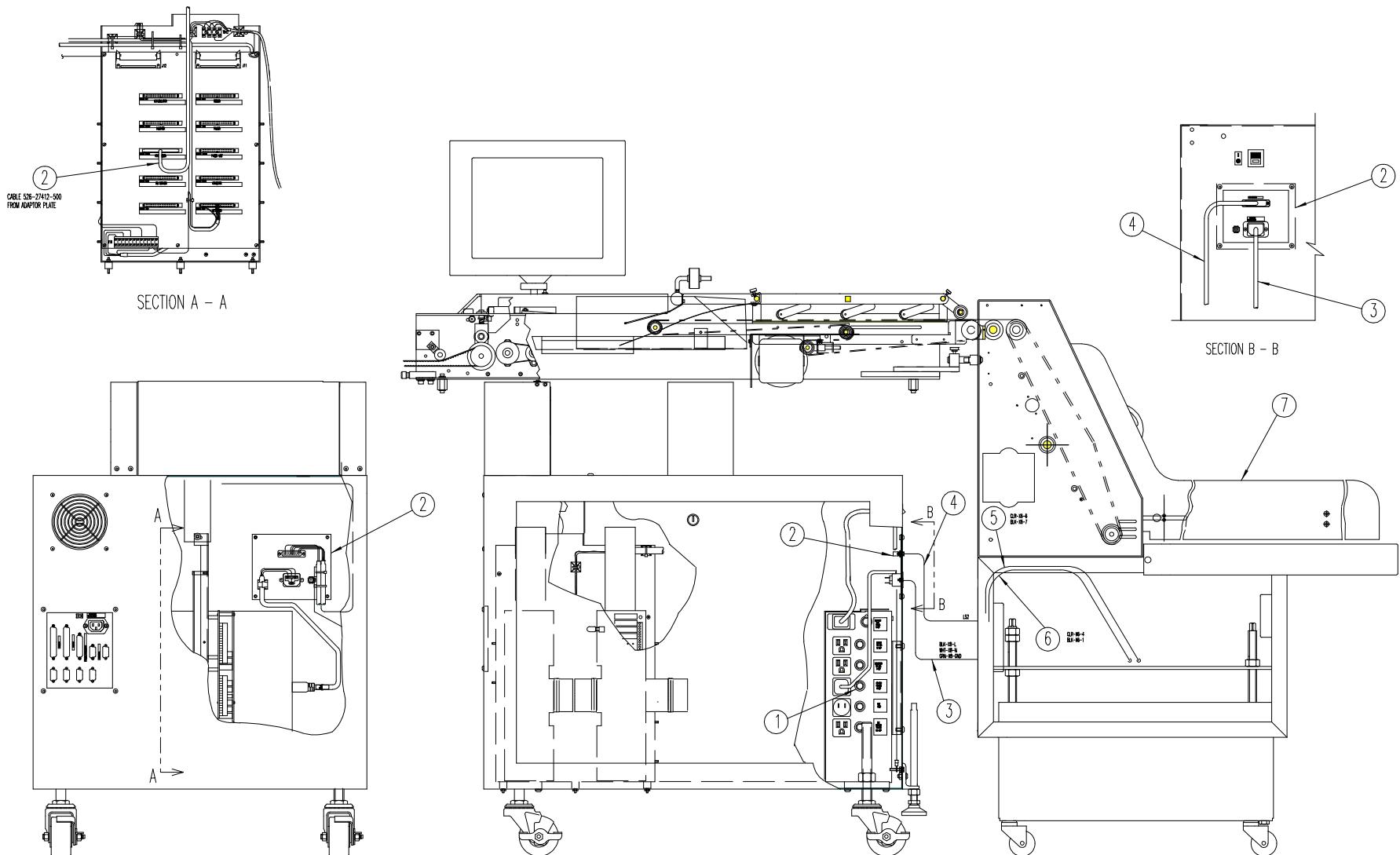
750-27737-500, 3208/FEEDER ELECT. INTERFACE, page 1

INDEX	PART NUMBER	DESCRIPTION
1	032-00080250	FUSE,8 AMP,250V,SB
2	091-27411-500	ADAPTOR PLATE ASSEMBLY
3	526-27407-500	LINE CORD ASSEMBLY
4	526-27408-500	470 INTERCONNECT CABLE
5	526-27409-500	E-STOP CABLE
6	526-27511-500	AUTO MODE CABLE
7	750-26978-500	3208/FEEDER MECH. ASSEMBLY

750-27737-500, 3208/FEEDER ELECT. INTERFACE, page 2

SECTION C – C
SCALE: 2X

CABLE 526–27412–500
FROM ADAPTOR PLATE

SECTION D – D

CLR-11
BLK-12

CLR-3
BLK-4

CABLE 526–27412–500
FROM ADAPTOR PLATE

RIGHT SIDE VIEW
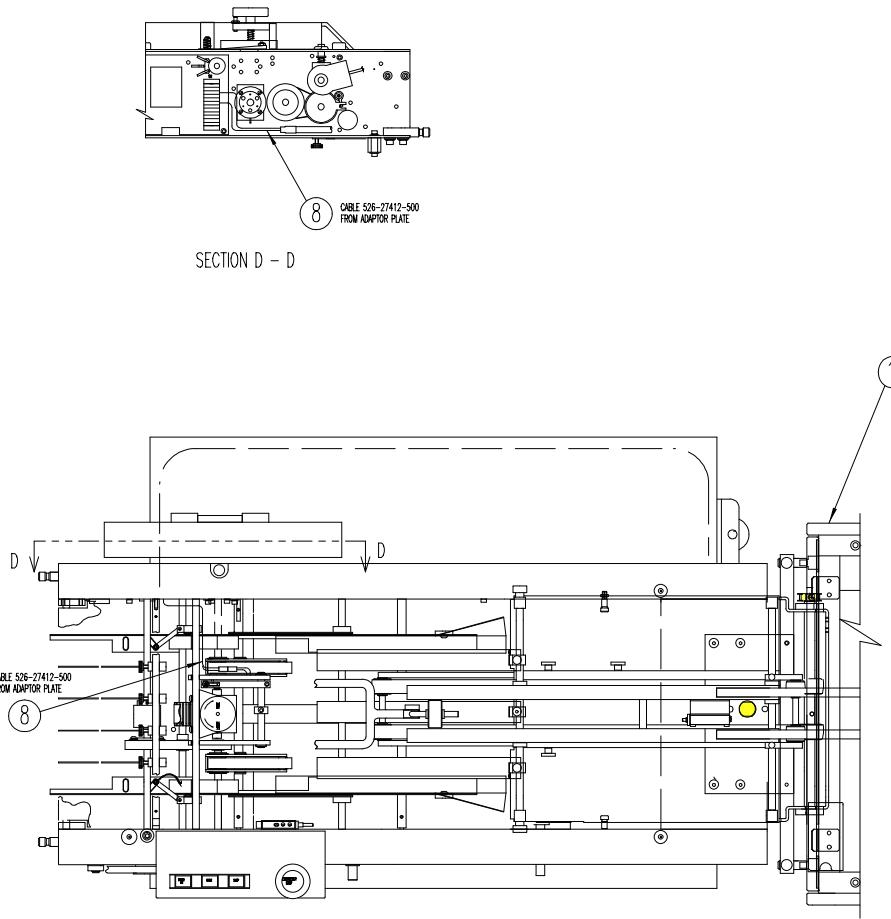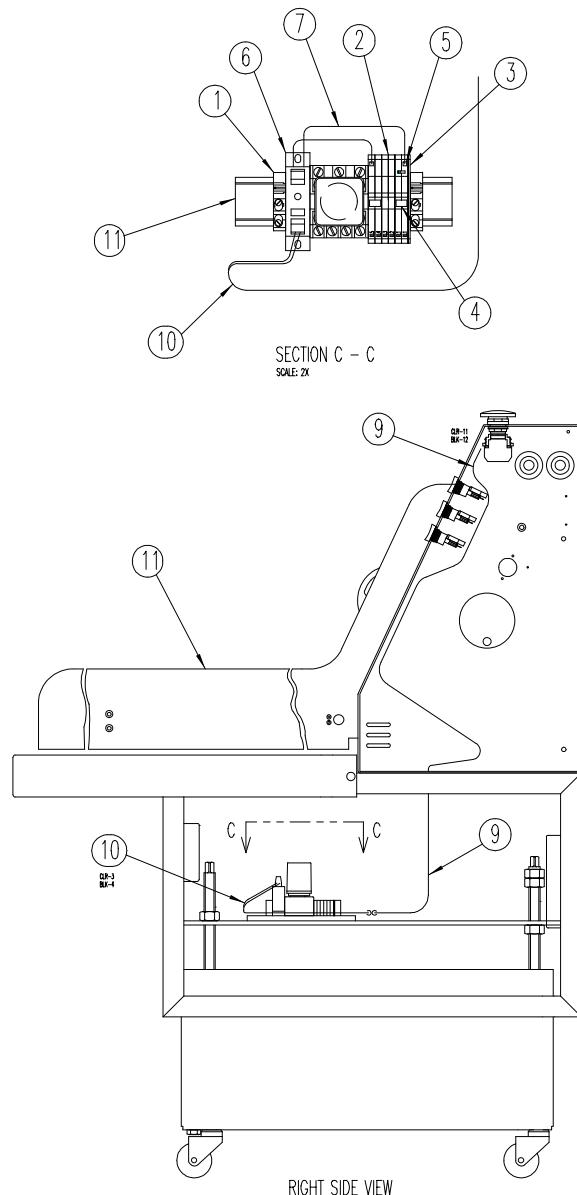
750-27737-500, 3208/FEEDER ELECT. INTERFACE, page 2

INDEX	PART NUMBER	DESCRIPTION
1	024-10300226	END STOP
2	024-26789-000	THROUGH TERMINAL BLOCK
3	024-26790-000	END PLATE
4	024-26791-000	ADJACENT JUMPER
5	025-25817-000	FERRULE,22 GA
6	030-26793-000	OUTPUT MODULE
7	045-022130	WIRE,BLK,22 GA
8	091-27411-500	ADAPTOR PLATE ASSEMBLY
9	526-27409-500	E-STOP CABLE
10	526-27511-500	AUTO MODE CABLE
11	750-26978-500	3208/FEEDER MECH. INTERFACE

044-27423-400, EUROPEAN POWER CONVERSION

SECTION A - A

PLUG IN

DISCONNECT SWITCH BOX MODIFICATION
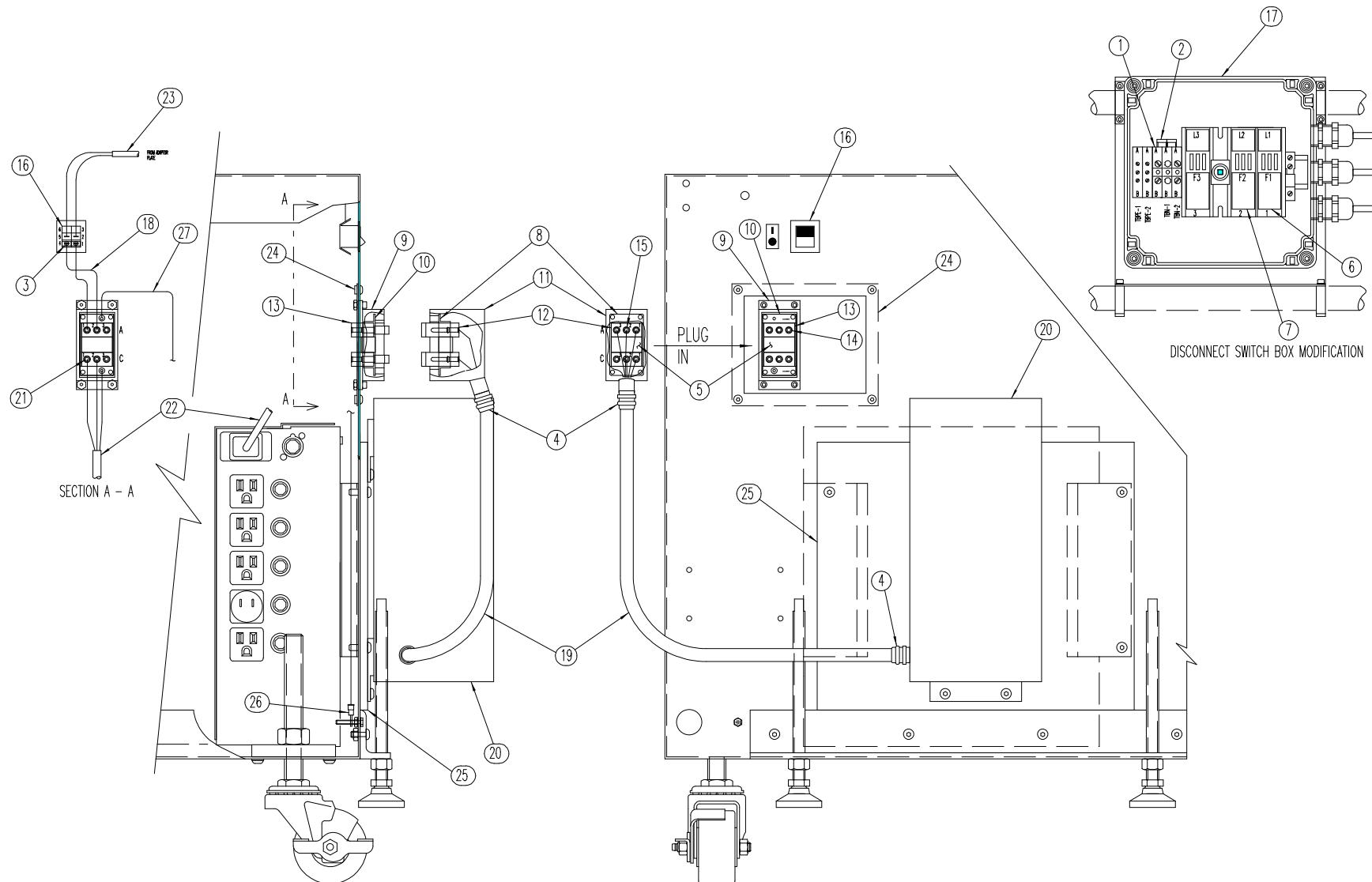
044-27423-400, EUROPEAN POWER CONVERSION

INDEX	PART NUMBER	DESCRIPTION
1	024-25384-000	TERMINAL BLOCK,NEUTRAL
2	024-26017-000	INSERTION BRIDGE
3	025-53125VN	Q-DIS,FEMALE,16-14 GA
4	026-27430-000	CABLE GLAND,15.5mm
5	026-27434-000	CONNECTOR DUMMY MODULE
6	032-26752-000	FUSE,10A,600V
7	032-26753-000	FUSE,15A,600V
8	035-27424-000	CONNECTOR FRAME,10 HOOD
9	035-27425-000	CONNECTOR HOUSING
10	035-27426-000	CONN. PANEL FRAME MOUNT
11	035-27427-000	CONNECTOR HOOD
12	035-27432-000	CONTACT,INSERT MALE
13	035-27433-000	CONTACT,INSERT FEMALE
14	039-27431-000	SOCKET CONTACT,14 GA
15	039-27435-000	PIN CONTACT,14 GA
16	041-25066	ROCKER SWITCH
17	041-26521-500	DISCONNECT SWITCH ASSEMBLY
18	045-014130	WIRE,14 GA,BLACK
19	046-0140581B	CABLE,5 COND,14 GA
20	062-TF217439S	TRANSFORMER
21	514-26146-000	CONTACT,SPRING CRIMP
22	526-26700-501	POWER SWITCH CABLE
23	526-26700-502	POWER SWITCH CABLE
24	584-27325-600	INFEED PLATE
25	584-27429-600	TRANSFORMER PLATE
26	025-B398VN	RING LUG,#8,14-16 GA
27	045-014135	WIRE,14 GA,GREEN

389-27146-400, BUHRS INTERFACE KIT
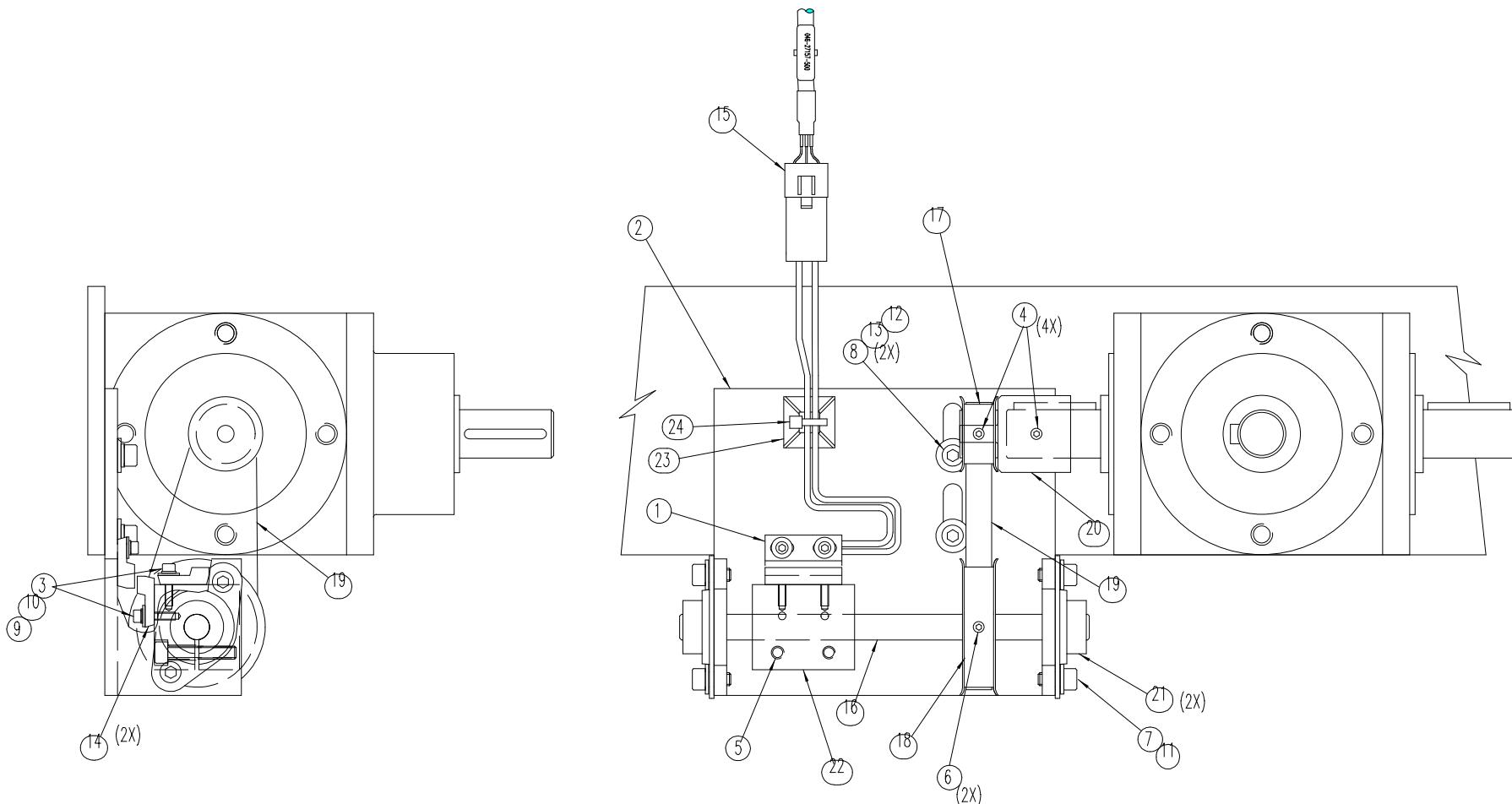
389-27146-400, BUHRS INTERFACE KIT, OPTIONAL

INDEX	PART NUMBER	DESCRIPTION
1	002B-08461	INTERLOCK SWITCH
2	007-27149-600	MOUNT BRACKET
3	014-04021106	SHCS,#4-40 X .375
4	014-08251103	SHSS, #8-32 X .187
5	014-10221116	SHCS, #10-32 X 1.00
6	014-08251106	SHCS, #8-32 X .375
7	014-10221106	SHCS, #10-32 X .375
8	014-M0621112	SHCS, M6 X 12mm
9	016-004	WASHER, FLAT, #4
10	016-104	WASHER, LOCK, #4
11	016-110	WASHER, LOCK, #10
12	016-M00600	WASHER, FLAT, M6
13	016-M10600	WASHER, LOCK, M6
14	041-35701	INTERLOCK MAGNET
15	046-27157-500	CABLE, DEMAND SWITCH
16	095-27150-600	SHAFT, SENSOR
17	112-200DOA14625	PULLEY,TIMING,1/5P,14T
18	112-200DOA28637	PULLEY,TIMING,1/5P,28T
19	113-200110037	BELT,TIMING,1/5P,11PL
20	129-27151-600	ADAPTER, SHAFT PULLEY
21	158-S3PPB5ST	BEARING, FLANGETTE
22	320-27152-600	MAGNET BLOCK
23	026-ABMMA	TIE WRAP ANCHOR
24	026-PLM1M	TIE WRAP
25	271-27146-400	TECHNICAL BULLETIN (not shown)
26	526-27622-500	SERIAL CABLE (not shown)

NOTES:

SECTION J. MB ACCUMULATOR

Mathias Bäuerle GmbH · Gewerbehallestr. 7-11 · D-78112 St.Georgen
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E-Mail: center@mb-bauerle.de

MB
MATHIAS BÄUERLE

Spare Parts Accumulator/38

ACCUMULATOR TOP VIEW

2030866

2029471
1143011 (3x)
M5x8 DIN 912

2029470
1143011 (3x)
M5x8 DIN 912

2029424

2030867

2017494 (2x)

3012205 (4x)

1143039 (4x)
M8x25 DIN 912

2001432 (4x)

1143011 (2x)
M5x8 DIN 912

2017497

1150018 (2x)
5x12 DIN 6325

1033165 (8x)

4005229 (4x)

1027342 (8x)

2017496

4005236

2022502 (2x)

1017555 (2x)

2022500 (2x)

2016814

2001393
2001468 (2x)

1143007
M5x10 DIN 912

2011605

1112025 (2x)
6901ZZ DIN 625

1027480 (2x)

2001455

2030855

2012752 (4x)
1143056 (8x)
M4x6 DIN 912

1107002 (2x)
A4.3 DIN 125

1143003 (2x)
M4x8 DIN 912

2001476 (2x)

1112013
6002-2Z DIN 625

2012754

1110013
9x1 DIN 471

2006618
1107001
A8.4 DIN 125
1143019
M8x12 DIN 912

1112005
6000-2Z DIN 625

1033095 (2x)

2051604 (4x)

1033063 (2x)

4005227

1110013
9x1 DIN 471

2006617
1107001
A8.4 DIN 125
1143019
M8x12 DIN 912

1033005

2030854
2036137 (2x)
1059028 (2x)

2013174
mit
3500015

2001468

2017499

2013014 (8x)
3504014 (8x)

1033166 (8x)

4002556 (4x)

INPUT SIDE TOP VIEW

EJECTOR SIDE TOP VIEW

2006618
1107001
1143019

1110013
2012754
1112005

1112013
1033095

1107002
1143003
2001476

2017494
2030867

2029470
1143011 (3x)
M5x8 DIN 912

2029424

2029471 (3x)
1143011 (3x)
M5x8 DIN 912

2030866

3012205 (4x)

1143039
2001432
1143011
2017497
1150018
1033165
4005229
1027342
2017496

INPUT SIDE VIEW

2001469 (2x)

2029474

1103039 (4x)
M5x8 DIN 84

2001469

4005960 (3x)

2017503

2017505

2021143 (4x)

1143007 (4x)

2030087

2001470 (2x)

EJECTOR ROLLERS

2017833

2017834

4006688 (4x)

4005233 (8x)

RIGHT SIDE VIEW II

2029423
1143011 (2x)
1107003 (2x)

1143007 (2x)
1107003 (2x)

2028216 (2x)
1150010 (4x)

2051810 (4x)
1143004 (8x)
M4x10 DIN 912

2051606 (2x)
1118004 (2x)
M6x8 DIN 913

1143004 (2x)
M4x10 DIN 912

2051605 (2x)

2051803

1103029 (2x)
M3x10 DIN 84

2017495 (2x)

1143006 (2x)
M5x16 DIN 912
1107003 (2x)
A5.3 DIN 125

2029464 (2x)

1017572 (2x)

1081022 (4x)

2029465 (2x)

2022697 (2x)

RIGHT SIDE VIEW II

1033094 (2x)
1001014
4005224
4005231 (2x)
2029448
4005226 (2x)
2036183

1011044 (2x)
1011004 (4x)

2022501 (2x)

1122003 (2x)
M5 DIN 934
1143006 (2x)
M5x16 DIN 912

1150011 (4x)
4x20 DIN 6325

1013058 (2x)
1118009 (4x)
M5x6 DIN 913

4005750

2051806

1033077
4005750
2036247

1143007 (4x)

LEFT SIDE VIEW

2029450

4005225

1143006

1122003 (2x)
M5 DIN 934

4005230

1108007 (4x)
B10 DIN 127

2001390 (4x)

1143006 (2x)
M5x16 DIN 912

1143028 (4x)
M10x25 DIN 912

1107003 (2x)
A5.3 DIN 125

1003037 (2x)

4005757 (2x)

2036334

1133010 (2x)
BZ 4 DIN 6799

1033014

1107001
A8.4 DIN 125

1122002
M8 DIN 934

2012734
1143004 (2x)
M4x10 DIN 912
1112025
6901-ZZ DIN 625

1027430

2041183

4005232 (2x)

1150012 (4x)
4x6 DIN 6325

1110023
24x1.2 DIN 472

2036248

CLUTCH-BRAKE

1103019
M3x5 DIN 84

1030284

2012751

2001559

2012999

1030342

1107001
A8.4 DIN 125

2001474

2017501

1122002
M8 DIN 934

1030285

2001472

2011619

1030343

1112030 (2x)
6900-ZZ DIN 625

1030344

1110030 (2x)
22x1 DIN 472

BALL BEARING EJECTOR SHAFTS

FLAT BELT DRIVE-LEFT INPUT SIDE

Zahnriemen 200XL 037
Timing belt 200XL 037

1031204

2023064

2001697

2001390

2012573

2021143

ACCUMULATOR PARTS LIST

Part#	Description	Qty
1001014	EXTENSION SPRING	3
1003037	COMPRESSION SPRING	2
1011004	CHAIN LOCK	4
1013058	SPROCKET	2
1017555	GUIDE PLATE	2
1017572	BEARING BLOCK	2
1019321	WASHER	4
1027342	COLLAR	8
1027430	KNURLED NUT	1
1027462	KNURLED KNOB	1
1030284	SOLENOID HOUSING	1
1030285	CORE	1
1030342	ROTOR-CLUTCH	1
1030343	CORE SECTION-CLUTCH	1
1030344	SOLENOID SECTION-CLUTCH	1
1033005	TIMING BELT	1
1033014	TIMING BELT	1
1033083	ROUND BELT	2
1033077	90XL 0.37 TIMING BELT	1
1033095	ROUND BELT	2
1033101	ROUND BELT	2
1033111	140 XL 0.37 TIMING BELT	1
1033165	ROUND BELT	8
1033166	ROUND BELT	8
1054012	M5X20 OVAL HEAD SCREW	2
1056001	PRESS NUT	8
1056003	M4 PRESS NUT	2
1059028	TEFLON BEARING	2
1081024	3X10 RIVET	4
1103011	M4X8 CYLINDER HEAD SCREW	4
1103019	M3X5 CYLINDER HEAD SCREW	2
1103029	M3X10 CYLINDER HEAD SCREW	6
1103039	M5X8 CYLINDER HEAD SCREW	4
1107001	PLAIN WASHER	6
1107002	PLAIN WASHER	10
1107003	PLAIN WASHER	10
1107005	PLAIN WASHER	1
1108007	LOCKWASHER	4
1109006	WASHER	1
1110013	SAFETY CLIP	2
1110023	SAFETY CLIP	1
1110030	SAFETY CLIP	4
1112005	BALL BEARING	2
1112013	BALL BEARING	1
1112025	BALL BEARING	7
1112030	BALL BEARING	2

1118004	SET SCREW	6
1118009	SET SCREW	4
1118015	SET SCREW	2
1220001	COLLAR	8
1122002	HEXHEAD NUT	2
1122003	HEXHEAD NUT	6
1143003	M4X8 ALLEN SCREW	2
1143004	M4X10 ALLEN SCREW	14
1143006	M5X16 ALLEN SCREW	12
1143007	M5X10 ALLEN SCREW	16
1143011	M5x8 ALLEN SCREW	10
1143019	M8X12 ALLEN SCREW	4
1143028	M10X25 ALLEN SCREW	4
1143039	M8X25 ALLEN SCREW	4
1143056	M4X6 ALLEN SCREW	8
1150011	M6X20 DOWEL PIN	4
1150012	M6X6 DOWEL PIN	4
1122003	HEXHEAD NUT	6
1143003	M4X8 ALLEN SCREW	2
1143004	M4X10 ALLEN SCREW	14
1143006	M5X16 ALLEN SCREW	12
1143007	M5X10 ALLEN SCREW	16
1143011	M5x8 ALLEN SCREW	10
1143019	M8X12 ALLEN SCREW	4
1143028	M10X25 ALLEN SCREW	4
1143039	M8X25 ALLEN SCREW	4
1143056	M4X6 ALLEN SCREW	8
1150011	M6X20 DOWEL PIN	4
1150012	M6X6 DOWEL PIN	4
2006617	STUD	1
2006618	STUD	1
2011605	SPACER BUSHING	1
2011619	SPACER RING	2
2012734	FLANGE	1
2012751	FLANGE	1
2012752	FLANGE	8
2012753	CLAMPING COLLAR	1
2012754	PULLEY	1
2012999	PULLEY	1
2013014	PULLEY	8
2013102	STUD	2
2017494	SPACER SHAFT	2
2017495	SHAFT	2
2017496	SHAFT	1
2017497	ROD	1
2017499	SHAFT	2
2017501	SHAFT	1
2017502	SHAFT	1
2017503	SHAFT	1

2017505	ROLLER	1
2021143	SPACER	4
2022500	PLATE	2
2022501	PLATE	2
2022502	PLATE	2
2022697	PLATE	2
2028216	BRACKET	2
2029056	COVER	1
2029057	COVER	1
2029424	GUIDE PLATE	1
2029464	GUIDE PLATE	2
2029465	GUIDE PLATE	2
2030565	RAIL	1
2029474	COVER, RIGHT	1
2029475	COVER, LEFT	1
2036183	PLATE	1
2036184	PLATE	1
2036247	PLATE	1
2036248	PLATE	1
2041183	SCREW	1
2051604	STOP	4
2051605	MOUNTING BRACKET	2
2051606	BLOCK	2
2051607	BLOCK	2
2051803	RAIL	1
2051806	ROD	1
2051810	BAR	4
2051847	PLATE	1
3012205	KNURLED SCREW	4
3500015	SET SCREW	1
3501069	COLLAR, CPL	2
3504014	SET SCREW	4
4002556	TRANSPORT ROLLER	4
4005227	PULLEY	1
4005229	PULLEY	4
2046216	TIMING BELT PULLEY	1
4005231	GEAR	2
4005233	PULLEY	8
4005236	TIMING BELT PULLEY	1
4005237	TIMING BELT PULLEY	1
4005750	TIMING BELT PULLEY	2
4005960	CLAMP	3
4006394	SPRING ELEMENT	2
2006511	STUD	1
2006647	STUD	1
4004630	PULLEY	1
2012573	PULLEY	2
2001785	BUSHING	1
1031204	FLAT BELT	1

|		
2017833	SHAFT	1
2017834	SHAFT	1
2022429	WASHER	4
2030932	LEVER	1
2030933	LEVER	1
2030934	BRACKET	1
2031061	BRACKET	1
2031062	BRACKET	1
2001842	SLEEVE	2
2001843	SLEEVE	1
2001845	SLEEVE	1
2030452	COVER	1
2052134	BEARING PLATE	2
2029175	COVER	2
2031666	RAIL	1
1011065	ROLLER CHAIN	2
2031625	BRACKET	2
2031626	BRACKET	2
2031636	RAIL, RIGHT	1
2031637	RAIL, LEFT	1
4006937	BELT TENSIONER	1
4006688	TRANSPORT ROLLER	4
2023434	PLATE	2
1029206	TERMINAL STRIP	1
2021092	WASHER	4
2021238	WASHER	2
2021269	WASHER	1
2021534	WASHER	2
2021984	WASHER	2
2022503	WASHER	5
1110008	10X1 SAFETY CLIP	2
1110023	24X1.2 SAFETY CLIP	5
1133010	SAFETY CLIP	2
1150010	M6X10 DOWEL PIN	12
1150018	M6X12 DOWEL PIN	2
1191013	16X22X0,2 SHIM	1
1192001	WASHER	14
1192002	5,5X18X1,6 WASHER	1
1150005	M6 x 14 DOWEL PIN	4
1150011	M6X20 DOWEL PIN	4

SECTION K – MB FOLDER

# 186-034007658, MB FOLDER, page 1

186-034007658, MB FOLDER, page 2
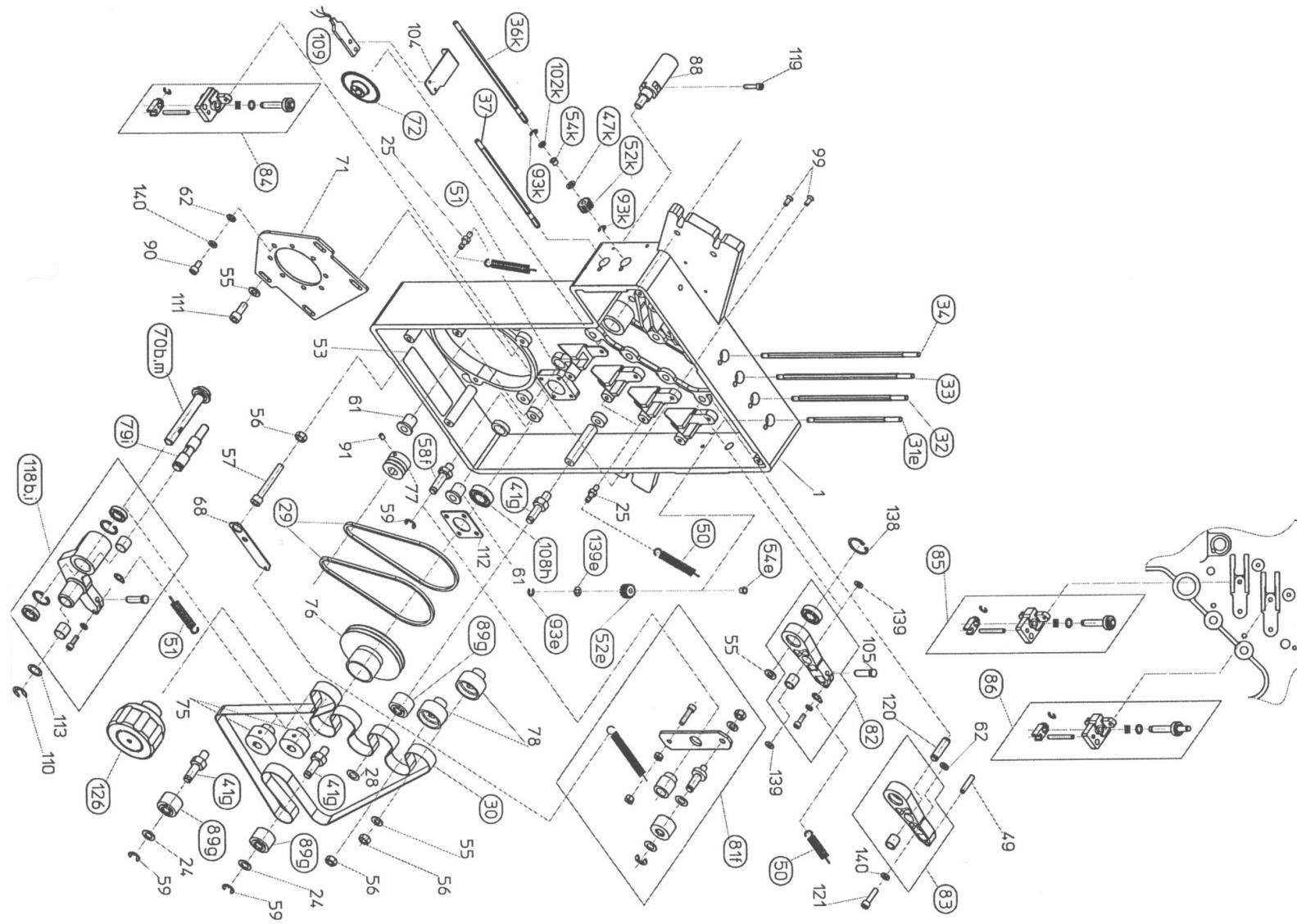
186-034007658, MB FOLDER, page 3
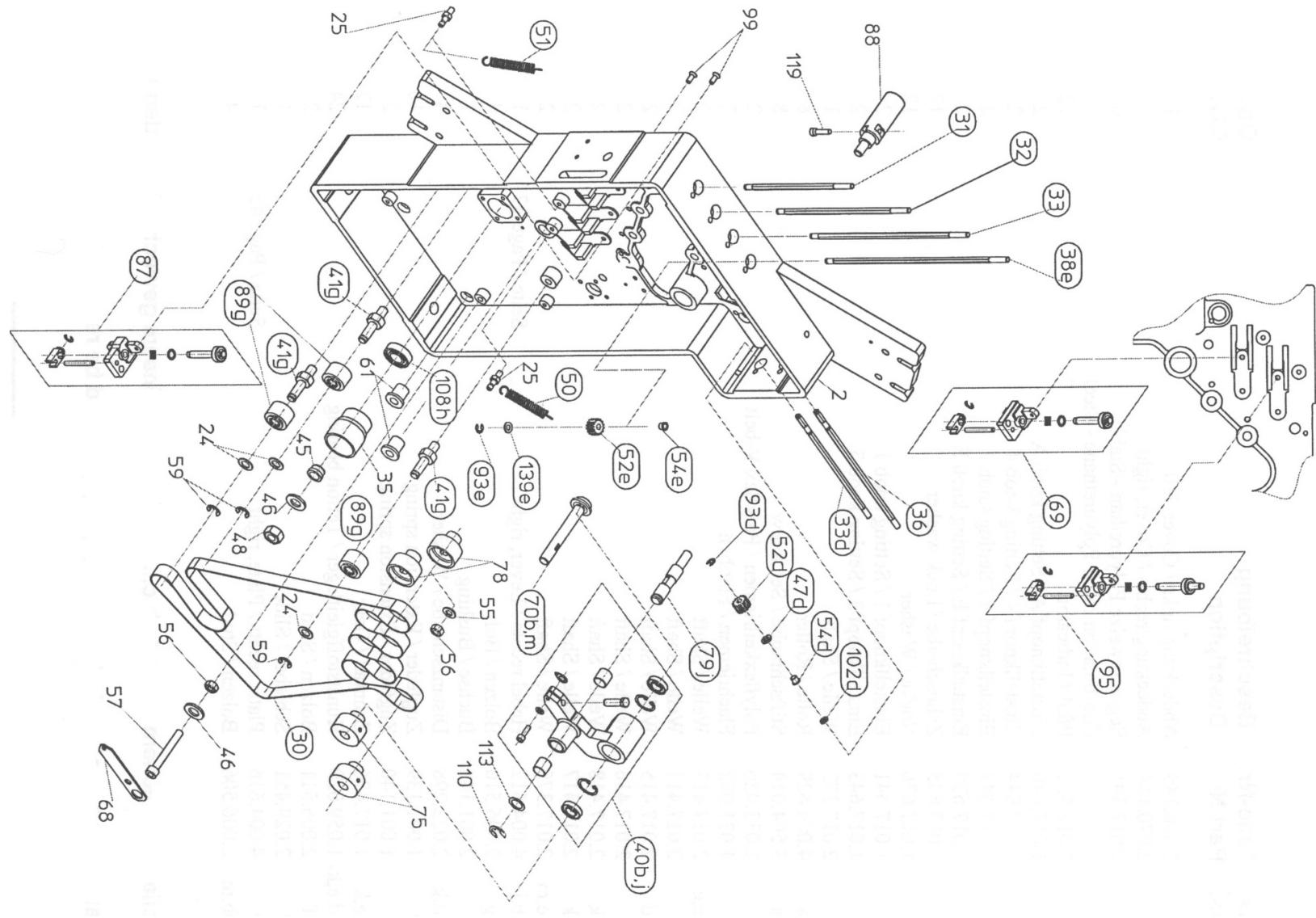
186-034007658, MB FOLDER, PARTS LIST

INDEX	PART NUMBER	DESCRIPTION
3	2.070.145	COVER, LEFT
4	2.070.144	COVER, RIGHT
5	2.017.391	ROLLER,POLY-STEEL
7	1.017.631	INDICATOR
8	1.017.640	SETTING KNOB A
9	1.017.644	SETTING KNOB 4
10	1.017.642	SETTING KNOB 2
11	1.017.639	SETTING KNOB E
12	1.017.635	LOCK WASHER
13	1.017.636	WASHER
14	1.017.641	SETTING KNOB 1
15	1.017.643	SETTING KNOB 3
16	2.017.373	SHAFT
18a	4.004.629	ROLLER
27a	3.504.014	SET SCREW
29	1.033.026	POLYFLEX V-BELT
30	1.031.072	FLAT BELT
31c,e	2.017.413	SHAFT
32	2.017.414	SHAFT
33d	2.017.415	SHAFT
34	2.017.416	SHAFT
36k	2.017.418	SHAFT
37k	2.017.417	SHAFT
38e,m	2.017.375	SHAFT
40b,j	4.004.612	LEVER,RIGHT
41g	2.006.510	BOLT
45	2.001.148	BUSHING
47d,k	2.022.298	WASHER
50	1.001.139	EXTENSION SPRING
51	1.001.140	EXTENSION SPRING
52e,k	1.017.496	GEAR
54d,e,k	1.059.029	TEFLON BEARING
58f	2.006.511	STUD
67	2.029.451	SLIDE
69	4.004.616	PLATE,RIGHT
70b,m	2.006.506	STUD
72	4.004.401	ENCODER DISK
79I,j	2.006.508	STUD
80f	1.200.005	ALLEN SCREW
81f	4.006.272	BELT TENSIONER
82	4.004.614	LEVER
83	4.004.615	LEVER
84	4.004.618	PLATE,RIGHT w/L. HAND THREAD
85	4.004.617	PLATE,LEFT
86	4.004.621	PLATE,LEFT w/L. HAND THREAD
87	4.004.619	PLATE,LEFT w/L. HAND THREAD
89g	4.004.630	PULLEY
93d,e,k	1.133.006	C-CLIP
95	4.004.620	PLATE,RIGHT w/L. HAND THREAD
96	2.027.940	SLIDE
102d,k	2.022.297	WASHER
108h	1.112.013	BALL BEARING
109	4.006.424	PHOTODETECTOR
114	1.030.147	MOTOR
118b,I	4.004.613	LEVER,LEFT
125	2.029.042	GUIDE RAIL
126	4.006.075	HAND WHEEL
131	1.003.089	COMPRESSION SPRING
139e	1.191.021	SHIM
141	2.029.041	PLATE
	4.007.914	FOLD PLATE 1
	4.007.916	FOLD PLATE 2 & 4
	4.007.915	FOLD PLATE 3